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SO conservative an authority and critic as the London *Times* describes as "a real crisis" the demand for nationalizing the railways of England made by the socialist and labor parties in that country and growing out of the railway strikes. Probably the description is too strong, and an expression of that ultra-conservative feeling, which in the American party phrase has "viewed with alarm" the national drift in the British islands toward old age pensions, employment insurance and similar forms of government paternalism. But one phase of the movement draws attention. It has started in the basic idea of a readjustment of railway wages upward; it has assumed already a political and party aspect; and it is attached to the implied, if not actual, theorem of delivering votes to candidates who favor railway nationalization and taking them away from candidates who

do not favor it. All this is *before* nationalization and, indeed, at apparently the incipency of the movement in England. What, then, would be the status and attitude of labor *after* the railways were nationalized, if they should be? Applying the query to our own country, where would be the limits of organized labor's dictation, where the checks on party timidities and resulting concession? We have one clue to the situation in the pension legislation now pending in Congress, though the analogy is a mild one as compared with the output of labor law-making that might follow federal railway ownership. There stands, too, the recent example of France to show us that state ownership gives no immunity from a strike. And all this refers to the labor branch of state ownership alone, leaving such matters as operation, finance and rates to their own complexities.

UNDER the readjusted scheme of railway taxation in New Jersey, the railway companies pay this year on their property in that state \$7,319,301, as compared with last year's \$5,347,524—an increase of \$1,971,777, or about 37 per cent. On the other hand, the New York, New Haven & Hartford pays this year on its steam railway property to Connecticut in taxes \$1,076,231, as compared with \$1,248,324 in 1910—a reduction of \$172,073, or nearly 13 per cent.—while the taxation of all the steam and street railways in the state falls from \$1,790,150 to \$1,659,264—a reduction of \$130,886, or somewhat more than 7 per cent. The reduction is caused in the Connecticut case chiefly by the lower market price of the stocks on which the tax is levied, that value thus becoming an important variable from year to year. New Jersey and Connecticut are both eastern states, and almost adjacent to each other, and, though due to widely different causes—and an exceptional cause in New Jersey—the contrast of results is suggestive as an illustration of the lack of harmony in systems of state railway taxation which prevails throughout the country. To harmonize those systems a somewhat unique plan is proposed by Allan Ripley Foote, president of the National Tax Association. He proposes, in the first place, a flat rate of 2 per cent. on operating revenue of all railway corporations, and next, a small fractional rate based on the difference between operating cost and revenue. His plan has the merit of simplicity and the assessment applies to definite and readily ascertainable sums. But it bears hard on the very poor roads which perhaps are earning nothing over fixed charges. For such a line the more flexible "market value" basis for taxation is much more equitable and satisfactory. For other lines the problem of just and fair taxation remains unsolved, but without diminishing the need of the states somehow getting together and at least reducing their wide disparities.

BOTH the Illinois Central Railroad and the city of Chicago are to be congratulated on the arrangement announced last week by which the railway company surrenders to the Board of South Park Commissioners its ownership of a part of the shore line of Lake Michigan and agrees to build a new passenger station, receiving in return an increased width of right-of-way. Especially is the Illinois Central management to be commended for the public spirit and the disposition to co-operate with the city authorities shown throughout the negotiations. The bargain made is one with which each party feels satisfied, which, after all, is the best kind of a bargain. There is little doubt that as far as physical value is concerned the Illinois Central has given up far more than the city. On the other hand, the railway should receive its reward from the results of improved relations with the city government and the public. In spite of a decision of the Illinois supreme court confirming the Illinois Central's riparian rights, the people of Illinois and of Chicago for many years have been taught to regard it as a usurper, and the fact that its right-of-way has occupied Chicago's "front yard" has been a source of public irritation. The Illinois Central has been most bitterly criticized by the Chicago newspapers, yet overnight, as a result of the concession made by it, the tone of the

press changed from one of captious and unreasoning fault-finding to one of almost fulsome commendation. The railway has been put in a new light which can hardly fail to be of much value to it. While the agreement with the South Park board has no direct bearing on the question of the electrification of the Illinois Central's Chicago terminals, the making and execution of the plans just agreed on should remove for a time all bitterness from the discussion of the subject of electrification, so far as it is concerned; and by the time the station is completed, three or five years hence, the railways and the people of Chicago will have received a report of the investigation of the entire subject of electrification in Chicago now being made by the commission appointed by the Chicago Association of Commerce.

CO-OPERATION of the right sort between railways and shippers is provided for by the recent action of Chicago railway and industrial traffic officers in appointing a joint conference committee to handle problems that may arise in connection with the administration of the Chicago uniform switching rules. Under the plan as outlined, the railways entering Chicago will first select a committee of their own traffic officers, and the shippers will then appoint a similar committee of their own. Each body will have its own chairman and hold individual meetings, but if occasion arises the two will be called together for joint decision and action. In the nature of things this joint committee will have no definite powers over the tariffs involved, and it is believed that its convening will be required but seldom, but the mere fact of its existence is expected to hold in check the tendency to allow differences of opinion between the buyers and sellers of freight service to develop into serious controversies. In the practical application of rules to a complicated situation, such as must necessarily exist in a railway and industrial center like Chicago, it is too much to expect that occasions for friction will not arise, but as good a means as that adopted for providing for co-operation can hardly fail of accomplishing material results. That the plan now being worked out is as a seed sown in prepared ground is shown by the history of the present Chicago uniform switching agreement, which is the product of the united endeavors of representatives of both the transportation and industrial interests of the city. The conference committee is, in a sense, but the establishment as a permanent institution of the committee, including representatives of the leading commercial organizations of Chicago and the railways, which spent over two years whipping into workable shape the switching agreement put into effect last August as a substitute for rule 23 of the Illinois Railroad Commission. The tariffs made were not entirely satisfactory to either interest, but agreement on them was acclaimed as a marked improvement over the alternative of commission regulation and court litigation.

ANOTHER instance where co-operation between the transportation and industrial interests is likely to bear good fruit is afforded by the action being taken by both regarding the bill pending before Congress to require the railways to enlarge their overhead and lateral clearances. The Special Committee on Relations of Railway Operation to Legislation has estimated, on the basis of reports from 109 railways, that the passage of this bill would put the railways of the United States to an expense of \$444,000,000. It was designed merely to regulate railways. But industries also have many miles of railway track in connection with their plants, the clearances of which would have to be enlarged to comply with the bill. There would be further large expense to industries involved in making the alterations in plants that would be required by the changes in the clearances of adjacent spurs and side tracks of the transportation companies. In this case the shippers are not only indirectly interested in the proposed additions to the railways' expense, which would have to be met from the rates collected by the roads, but they are directly confronted with the possibility of being subjected to a similar expense. The National Industrial Traffic League has taken up the matter by appointing a committee to investigate and report

on the effect of the proposed clearance bill on the industrial interests. This committee, of which F. T. Bentley, traffic manager of the Illinois Steel Company, is chairman, has already begun its work by sending out blanks for the members of the League to fill out. While it has not got far yet with its investigation, it has found that the expense of complying with the law in a single large plant would amount to the respectable total of \$3,980,000. For another plant a merely preliminary investigation disclosed that the cost would reach \$1,600,000, at which point the inquiry was abandoned in dismay because it was seen that literal compliance with the bill would involve reconstruction of the whole works! Frequently laws have been passed which have entailed unreasonable expenditures by the railways, and there was none to voice a protest against them but the railways themselves. If the clearance bill is pressed for passage the situation will be made to present a somewhat different aspect by co-operation with the railways by the industrial interests.

DOWN to the end of a period closing about ten years ago, the railway companies of Connecticut followed the even then time-dishonored custom of giving free passes for the session to members of the state legislature. Finally, a statute was enacted forbidding free passes; but it was enacted also that the state should provide session mileage books purchased from the railway companies, which the legislators could obtain on assignment to the state of their old-time mileage—fixed by the state constitution at 25 cents each way for the regular or an extra session. Then a member of the legislature, living say 10 miles from Hartford, in effect, got for \$5 a general mileage book good on the particular line during the whole session of the legislature which this year (1911) lasted eight and a half months; and to such an arrangement, obviously welcome to the legislators, the railways, which in 1911 have received some \$37,000 from the state for mileage books, are not averse. But the plan has now struck a snag. Governor Baldwin, on a question of paying a small residual balance to a railway company, asked the attorney-general of the state to pass on the constitutionality of the "mileage book" statute and from him has come the remarkable finding that, while the constitution has been violated, the bill had better be paid as a matter of "custom." To let "custom" over-ride a state constitution introduces us to a new phase of the antique political aphorism: "What is the constitution among friends?" Also, if the Connecticut statute is unconstitutional, what is the status of the large moneys paid the railways in past years under it? And, as it requires two legislatures and a ratifying popular vote to amend the Connecticut constitution, what will be the mileage book status of the legislature to be chosen next November and to meet in 1913? The lot of a state legislature deprived at one fell stroke of both free passes and state-bought mileage books is too pathetic for words.

THAT the Wabash should have been operated in such a way as to keep it out of the hands of a receiver for so long is a fact that its operating management may well be proud of. Probably the receivership has been inevitable ever since 1908, but in the meantime, without credit and without anywhere nearly adequate additional capital, the road has earned its fixed charges. It is unfortunate, of course, that the finances of the company could not have been readjusted without the expenses of receivership; but that some sort of a readjustment was absolutely necessary a mere glance at the price at which the Wabash securities are selling clearly shows. The burden of the receivership will have to be borne by the investors who have put their money into its securities, and that is exactly where the burden belongs. The receivership of the Wabash is a good example of how impossible it is for a railway company to pass along the burden of unwise financing so as to place it on the shoulders of the shipping and traveling public. If any road ever had an incentive to charge higher rates because it needed the money, the Wabash was that road, but rates should be based on the general situation, not on the condition of either the strongest or the weakest roads. The Wabash could not charge any more than its com-

petitors, therefore the penalties for former financial mistakes are not borne by the public but will be borne by the stock and bondholders of the company. The present security holders may be innocent enough of any improper financial methods; certainly the present operating management of the road is not responsible for these financial mistakes. The mistakes which have led to the present receivership have been commented on before in these columns. They may be summed up by saying that the credit of the Wabash, already a company capitalized at a higher figure than its earning power would warrant, was used to gain an entrance for the Gould roads into Pittsburgh, and was exhausted at the very time at which the Wabash itself should have used this credit to pay for additions and betterments to its existing property. If, however, the reorganization is drastic enough, the receivership may be a blessing, both to the company itself and to the shippers who will benefit by additional capital being put into the road. It will be extremely interesting to watch the progress of the Missouri Pacific's rehabilitation and compare it with that of the Wabash, because the two Gould roads present such striking contrasts. The Missouri Pacific was in by no means such difficult financial straits as the Wabash, and the Goulds retained control of the company and succeeded in making arrangements for future financing without any receivership, while, on the other hand, the property itself had been inefficiently operated and maintained. In contrast, the Wabash had been very efficiently operated and maintained, while its finances were in such a complicated tangle that a receivership was the only possible course, and it appears as if the Goulds had not retained undivided control.

A BRIDGE carrying one of the important thoroughfares over the main tracks of one of the busy railway lines in Philadelphia was found to be on the verge of collapse, a short time ago, although at that time it was under a very heavy street car, teaming and pedestrian traffic. This is but one instance of a condition existing all too frequently in many cities. In this case workmen had repaired the floor of the bridge but a short time before and, while inspection would have been easy at that time, the condition of the structure had not been noted. It is said that after a personal inspection experts were unable to account for the fact that the bridge stood up at all even without any load. In another case in the same city, about two months ago a bridge over the tracks of another railway collapsed while workmen were engaged in repairing it, causing the death of two men and the injury of eight others. When the Kansas City Terminal Railway Company took charge of the maintenance of structures over its tracks under the terms of a new ordinance about a year ago, an inspection of them was made at once, and similar conditions were found. Traffic was immediately stopped on several bridges until proper repairs could be made. In one case, while repairs were being made on a bridge carrying very heavy street car traffic, the structure buckled when the hand rail was removed. Other instances of weakened bridges have been found in Chicago and other cities. These cases are confined almost entirely to bridges maintained by municipalities, and they indicate that but little attention is being given to the proper inspection and maintenance of these structures. These cities have regularly organized engineering departments, whose duty it is to attend to such work. The effects of the corrosive action of locomotive gases on steel have been known for many years and should be guarded against in all cases. Bridges subject to such action should be inspected by the city authorities as regularly as the railways inspect similar structures for which they are responsible, and the railways should be supplied with copies of such inspection reports that they may be able to know that proper precautions are being taken. While not causing the same degree of danger to railway operation as a structure carrying tracks, an unsafe viaduct or bridge over the tracks is a menace to the safety of railway operation as well as of the public using the structure. The railways are careful to require that proper precautions be taken at crossings of high tension electric power lines and of other railway lines. They should also be able to get the same precautions taken at street crossings

maintained by cities. The failure of municipalities to do their plain duty in respect to such matters, while requiring the railways to spend huge sums to make railway operations and structures safe, is a striking example of inconsistency, and may indicate how much active solicitude for public safety public officials would show if they were operating the railways instead of trying to tell railway managers how to do it.

SELDOM has an editorial in this or any other paper produced such great and immediate effects as the one entitled, "Abolish the Present Giving," in our issue of December 1. It has resulted in action which, it is believed, practically ends the practice mentioned, so far as the railway and railway supply business are concerned. Men engaged in other businesses might well follow the example set. The *Railway Age Gazette* does not claim all the credit for this reform. Its comments merely crystallized the views of railway and supply men on the subject and precipitated action which, sooner or later, probably would have been brought about by some other means if it had not been brought about in this way. No better illustration could be afforded of the high character of most of those who are responsibly concerned with the sale and purchase of railway supplies, or of their desire and appreciation of the need of putting and keeping their business relations on a basis that cannot be criticized. However much the custom in question has been abused, there are many who have participated in it who did not begin and have not continued doing so from improper motives. But even most of these have bowed to the opinion of the majority. The example set in this case might well be followed in others. Railway men cannot effect all the reforms in their business that are needed without the co-operation of other interests. They cannot eliminate all unfair discrimination in rates without the co-operation of shippers; they cannot get as good rails as safe operation requires without the co-operation of the rail manufacturers; they cannot reduce the large majority of accidents without the co-operation of their employees. Cannot railway managers get that co-operation of other interests which is necessary to change the various conditions that need changing? A still broader question may well be asked. Cannot "big business" generally, by the voluntary co-operation of those directly concerned reform itself in accordance with reasonable public demands? The practical abolition of the giving of presents by railway supply men to railway men is a relatively small thing; but may we not hope and believe that it is a sign of a new spirit among business men which will accomplish larger things?

THE COST OF CITY TICKET OFFICES.

ONE way in which it would seem the railways could effect substantial economies, while not only not impairing, but actually improving, their public service, would be by establishing joint city ticket offices in the large cities. A committee of passenger officers after a thorough investigation not long since reported unanimously in favor of such a move at St. Louis. It estimated that at that time the rentals paid for uptown ticket offices in that city were \$142,600 a year, and that the cost of operating them was \$55,906, a total of \$198,506. It estimated that the rental of an adequate joint ticket office would be \$50,000, and the cost of operating it, \$51,000, a total of \$101,000, or a saving of \$97,506 a year.

Figures the *Railway Age Gazette* has obtained show that since then there has been an increase in the annual cost of the St. Louis offices. The present rentals aggregate \$12,458 a month, and the salaries of those employed in them, \$6,715 a month, a total per year of \$230,076. In Kansas City the rentals for the city ticket offices of 11 roads aggregate \$3,110 a month and the salaries \$3,176 a month, a total of \$75,432 a year. We have also got some figures for the city ticket offices of 13 railways in Chicago. Their annual rental is \$141,500, and their annual pay-roll \$155,700, making a total of \$297,200. This includes the figures for only about one-half the city ticket offices in Chicago, and probably an estimate of \$550,000 a year for the rentals and pay-rolls of them

all is not far wrong. Therefore, we estimate that the rentals and pay-rolls of the city ticket offices in only the three cities of Chicago, St. Louis and Kansas City aggregate over \$855,000 a year, an amount equal to the interest at 5 per cent. on \$17,100,000. It is probably conservative to say that 50 per cent. of this, or almost \$430,000 a year, could be saved, by the establishment of joint city ticket offices. That so much could be saved in three cities indicates how large an aggregate economy could be made by similar means in the entire country.

Of course, if the economy that could be effected were compared with the total operating expenses of the railways of the United States, or even with the operating expenses of the passenger service alone, it might seem small. But, if all of the relatively small economies that might be made were effected they would aggregate a very large sum; and to pursue a policy of not making any particular economy, because it alone would not greatly contribute to net earnings would be to act on a principle which, if consistently carried out, would wipe out all net earnings.

As for the service rendered to the public, only casual consideration is necessary to show that it would be improved by carrying out such a plan as that outlined by the St. Louis committee. Under this scheme the location of the joint office was to be as central and convenient for the public as could be secured. Complaints and inquiries were to be handled by an information bureau which was to be very carefully organized. Room was to be provided in the office for the St. Louis Transfer Company, both telegraph companies, a taxicab stand, a separate Pullman office and both telephone companies. The superintendent and assistant superintendent of the office were to be appointed by the Terminal Railroad Association, and would, therefore, be absolutely neutral. Ticket sellers were to sell tickets over any and all roads and were to observe the strictest neutrality. The street men or other representatives of the individual roads were not to be allowed to solicit or influence business inside the office, and authority was to be given to the superintendent to enforce this regulation.

Under present conditions few or no city ticket offices have all the conveniences which it was proposed to provide in this joint office. As long as individual offices are maintained, if a traveler desires to ride over one road and finds he cannot get a sleeping car reservation on it he must go out and hunt for the office of a competing line. This subjects him, especially in bad weather, to inconvenience which he would be saved by the establishment of joint offices. In some places the establishment and operation of a single joint office would be impracticable. For example, in New York it would be necessary to have at least an uptown and downtown office, and doubtless more than one uptown. But whether in any given city it would be necessary to have one or more joint offices, the economy that it would be to the railways and the convenience it would be to the public to have all ticket offices joint seems obvious.

The main difficulties in the way of establishing joint offices are differences of opinion as to the way the expenses should be divided between the railways, and doubt and fear as to how such an arrangement would affect the business of the roads individually. Two plans for the division of rentals and expenses were suggested by the St. Louis committee. One was for each road to pay a minimum contribution of \$1,500 a year to rent, and a minimum contribution of \$1,500 a year to expense account, the rest of the rent and expense to be pro-rated among the roads on the basis of actual ticket sales made in the office. The second plan was for each road to pay a minimum of \$3,000 and a maximum of \$9,000 a year for rent and expenses. Unquestionably, a satisfactory scheme for dividing expenses could be worked out. The rock on which the St. Louis scheme seems to have split was the competitive jealousies and fears of the individual roads. Perhaps some light is thrown on how much ground there was for these fears and jealousies by the fact that some of the strong roads thought a joint office would hurt them to the benefit of the weak roads, and that some of the weak roads thought it would hurt them to the benefit of the strong roads.

The service given to the public under such an arrangement

could and probably would be made better than it is now; substantial economies in the aggregate would be effected; and even though some roads gained more by the change than others, it is very questionable if any would actually lose by it.

EXCESSIVE CAR WHEEL LOADS.

THE proposed use of 80-ton freight cars with four-wheel trucks for special service naturally suggests some consideration of the effect of excessive loads on the rail, the wheels and the journals of very high-capacity cars. The limits for the unit pressure on these details have been frequently fixed by engineers, as failures of structures or material have developed, but these limits have steadily increased as the traffic conditions have demanded larger capacity in railway equipment. In this development the design and proportion of the structure have been made adequate for the service, and material has been so improved as to safely sustain the load, but with increasing wear and more rapid destruction as the greater loads have been imposed. In 1882 the M. C. B. Association discussed a report on the Capacity of Freight Cars—Can it be Safely Increased above 20 Tons? The car wheel load was then 8,000 lbs., and 12,000 lbs. was regarded as a proper limit for the weight on a locomotive driver. (Master Mechanics' Association Proceedings, 1882, page 25.) Even at that time the Pennsylvania and the Reading were experimenting with locomotives with a load of 16,000 or 17,000 lbs. per wheel, and the Great Northern of England was operating a locomotive carrying 20,000 lbs. per driver. In the United States we now have engines with a load of 30,000 lbs. per driving wheel.

The proposed 80-ton car will weigh about 50,000 lbs., and the total weight of the loaded car will be 210,000 lbs., which when carried by 8 wheels produces a static load on the rail of 26,250 lbs. Weights on drivers have always greatly exceeded the load on the smaller car wheels, and there are reasons, apart from the effect of the difference in diameter on the rail, why small wheels will not endure as severe service as large ones. It is taken for granted that solid steel or steel tired wheels will be used for the high-capacity cars, as the solid steel wheel is already largely used for 50-ton cars. The smaller steel wheels or tires do not render as satisfactory service under heavy loads and high speeds as the larger locomotive tires, principally for the reason that the manufacturer is not able to put into the small tire sufficient mechanical work to obtain uniform physical properties for the full circumference of the tire, and in the service portions of the tread thickness.

The experience with 36-in. steel-tired wheels under locomotive tenders is instructive on this point and illustrates the great difficulty which the solid steel wheel makers will find in their effort to produce a wheel adequate for the service under 80-ton cars. The steel tender wheels have failed by shelling out, and portions of the metal of inferior physical structure on one-third of the circumference have worn so as to make an eccentric tire which has caused such severe impacts on the rail as to require the removal of the wheels after a short service.

The average load on these wheels is 18,000 lbs., and the maximum static load 20,400 lbs.; many of them give only six months' service, or 30,000 miles, after the first or second turning. The tire defects develop most rapidly in winter, and this has been explained as due to two causes; first, the increased stress caused by the greater shrinkage on the wheel center at low temperature; and, second, the effect of cold on the steel structure. The popular opinion has always been that extreme cold makes steel more brittle, but investigation has shown that much of the failure of steel in winter has been due to other causes. Good authority now holds that there is a molecular change due to unequal contraction between the different components which make up the micro-structure of the steel, and this increases the brittleness at extremely low temperatures. The principal cause of the shelled-out spots is entrained impurities, which become the starting point of failure in different portions of the tread. The texture of the steel is coarse and fragile, incident to soaking

in the furnace at the high temperatures to which it is subjected in fabrication. The surface of the tread is made more dense by rolling, but the interior portion has an inferior structure, as is shown by the short service obtained after the first or second turning. Locomotive tires receive much more work in rolling than the smaller car and tender wheels, and tires which are worked from both sides should render longer service than solid wheels which are rolled mainly on the outer surface of the tread.

It would appear, therefore, that solid steel wheels under loads of 25,000 to 30,000 lbs. should be made of metal having a higher degree of purity and more uniform physical properties in the entire circumference of the tread. They should also be annealed to secure a finer grain, and it may be found economical to harden the tread and flange by oil tempering. Tires made in this way are now being tested, and the results should show whether the process could be profitably applied to steel car wheels for the high-capacity freight cars.

In a paper read at the last International Railway Congress, published in the Bulletin of October, 1911, Dr. P. H. Dudley has proposed a new method of measuring the tonnage service of rails and wheels. He explains that the tonnage supported by a given portion of the bearing surface of a rail due to a passing wheel is the total wheel load multiplied by the number of wheels passing over it. The tonnage sustained by the metal in the treads of the wheel is the total wheel load multiplied by the number of revolutions, and this tonnage accumulates more rapidly than that of the rail. It is greater also as the diameter is less and the number of revolutions larger, so that the tonnage service of 36-in. tender wheels is much greater than that of the 75 or 80-in. drivers, though the load on the latter may be much larger. It will explain also why the service obtained from steel tired tender wheels is so much less than that of the same-size wheels under Pullman cars, as the load on the former is 9 or 10 tons per wheel and on the latter only 5 or 6 tons. We may now determine what the relative service tonnage of the tires of Pullman wheels, tender wheels and driving wheels will be by the method of measurement proposed by Dr. Dudley.

Wheels 36 in. in diameter under Pullman cars and tenders make 560 revolutions per mile. Pullman wheels 36 in. in diameter with a load of 5 tons per mile, therefore, render a service of $560 \times 5 = 2,800$ tons per mile. Tender wheels 36 in. in diameter, with a load of 9 tons per wheel render a service of $560 \times 9 = 5,040$ tons per mile, and a 78-in. driving tire making 258.6 revolutions per mile, with a load of 15 tons per wheel, renders an equivalent service of $258.6 \times 15 = 3,879$ tons per mile.

In this way it is shown that the large drivers with excessive wheel loads do not accumulate tonnage upon the tread of the tires as rapidly as tender wheels. The 33-in. steel wheels for 80-ton freight cars will have a static load of 13 tons per wheel and make 611 revolutions per mile, so that they must render a tonnage service of 7,943 tons per mile, or nearly 3 times that of Pullman wheels, and more than $1\frac{1}{2}$ times that of the tender wheels which are failing so rapidly from excessive wheel load on tires of small diameter, showing that a satisfactory steel wheel for the heavy freight cars must be superior to those now in general use. This method of comparing the service of steel tires indicates that mileage alone is not a sufficient measure, but the weight on wheel and the diameter of tire should be included, and these items will help the tire and wheel makers in selecting the service which requires special steel and special treatment of the tire in order to avoid excessive wear and short life.

The method thus far considered has used the static load on the wheel and does not take account of tire wear, which is due to the speed of revolution and should increase as the square of the speed. This "generated wheel effect" may increase the load on the wheel 50 per cent., depending on the condition of the tire and the stiffness of the rail. With truly circular wheels mounted concentric on the axles and running on a good track with heavy rails, the generated wheel effect is slight, but as the wheel wears irregularly and becomes eccentric, and the rail surface is not maintained it may almost equal the static load,

and the total load tending to produce abrasion and shelling out will be double the static load. This feature of wheel and rail wear is too indefinite to include in any accurate comparison, but is favorable to wheels under heavy freight cars on account of their slow speed. A further study of the subject with some experience with small wheels under what is now regarded as excessive loads and running at comparatively slow speeds may result in formulae for tire wear which shall take account of speed as well as diameter and load. The strength, wear and friction of larger diameter journals for 80-ton freight cars will also be important questions for observation and future study.

SHALLOW BRIDGE FLOORS.

COINCIDENT with the introduction of the concrete trestle and the concrete slab deck, another interesting development in the field of railway bridge design within the past few years, has been that of the shallow bridge floor. Considerable attention was given to this type of floor several years ago, but within the past three or four years interest in it has been revived and its development has been rapid. The development is described in the paper by Mr. Dalstrom in this issue, together with details of different types of floor design. A floor of this same general type was also described in the issue of the *Railway Age Gazette* of October 20 in connection with a description of the belt line of the Chicago & North Western at Milwaukee. While there always have been places where the clearance has been limited and where it would seem advisable to decrease the depth of the floor, and thereby increase the clearance, the number of such cases has greatly multiplied in recent years. The large amount of track elevation work in different cities, and especially in Chicago, and also the large number of railway grade crossings eliminated are very largely responsible for the attention given to the shallow floor design. In such work the grade of the track is determined by the clearance required from the low point of the steel to the grade of the street or track below, and the closer the grade of the track is brought to this low point of the steel the less the amount of filling and masonry for retaining walls that is necessary.

From the standpoint of the construction engineer the minimum depth of floor is advisable. However, from the standpoint of the bridge engineer other things must be considered. As shown in the comparison of costs of the ordinary open floor and the shallow trough floor for 170-ft. span, the excess in cost of the shallow floor over the open floor is 66 per cent. For other spans the ratios would vary, but the excess is large in all cases. Where conditions make it possible to use either type of floor considerably more than this excess in first cost can be economically expended in additional grading to raise the tracks enough to put in the deeper floor and still maintain the desired clearance. The deflection and vibration in a shallow floor are greater than in an ordinary floor. For this reason the different parts tend to become loosened more rapidly, and more frequent inspection and repairs are necessary, materially increasing the maintenance cost. However, there are many cases where other limiting conditions occur, such as the location of the bridge on ruling grades where the reduction of 12 or 18 in. in depth of floor makes an improvement in operating conditions. In such cases the shallow floor is justified in other grounds than those of economy of first cost.

It is necessary that the bridge engineer use careful judgment in deciding where shallow floors are advisable. The locating engineer will frequently maintain that it is impossible to provide clearance for the standard floor at points where he would never have thought of other than the standard floor a few years ago, and where a slight adjustment in grade line will allow the deeper floor to be used. The shallow floor is of great advantage in certain places where limiting conditions are encountered, but is hardly justified under ordinary conditions where the deeper floor can be used with a slight readjustment of grades or additional expense for grading. This development of the shallow floor is, however, of considerable importance to bridge engineers and enables them frequently to meet conditions more satisfactorily than would be possible by any other type of construction.

Letters to the Editor.

A STATISTICIAN MISTAKE.

December 6, 1911.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

Professor Ripley's article in your issue for December 1, 1911, furnishes a curious illustration of the persistence of error even in its crudest form. Professor Ripley says:

"For the year 1900 the increase in stock was more than two and a half times as great as the increase in funded debt; but, as the statistician of the Interstate Commerce Commission remarks, this can hardly be interpreted as a healthful tendency, since the increase in indebtedness alone exceeded the probable cost of railway construction during the year."

The foregoing is based upon the following which appeared in Professor Adams' report on Statistics of Railways in the United States for the year 1900:

"... it is pertinent to notice that the increase of \$457,080,062 in railway securities is synchronous with an increase in mileage of 4,051.12 miles. It can hardly be claimed that the issue of securities for the construction of this new mileage would exceed \$120,000,000, which would leave an increase of \$337,080,062 to be explained in some other manner. . . . It is a significant fact, and not entirely in harmony with the trend of previous years, that the increase in stock is more than two and a half times as great as the increase in funded indebtedness. Ordinarily this would be regarded as a helpful tendency, but this can hardly be so interpreted in the present instance, in view of the fact that the increase in bonded indebtedness alone is in excess of the probable cost of railway construction during the year." Thirteenth Annual Report on Statistics of Railways in the United States, p. 54.

The fact is that what Professor Adams criticized in the foregoing extract, and what Professor Ripley now follows him in condemning, never happened. Both have been led astray by the duplication in capitalization due to ownership of railway shares and bonds by railway corporations. The real increase in securities, outstanding as against the railway system as a whole, between 1899 and 1900, was \$115,942,880, but during that year shares in other companies owned by railways increased \$262,720,673, and bonds \$78,416,509.

In the Yale Review for August, 1902, I commented upon this remarkable instance of a statistician falling into a pitfall of his own digging, as follows:

"When public opinion regards railway capitalization as excessive, as it undoubtedly does; when a widely prevalent prejudice conceives that this over-capitalization is the cause of high rates, and when not a few citizens honestly believe that the total par value of railway securities has been increased with the deliberate purpose of defrauding the shipping and traveling public and deceiving legislative bodies, the adoption by a federal statistical agency of a method which exaggerated the total capitalization existing on June 30, 1900, by more than one-fifth of the actual amount and has never failed to overstate it by at least 16 per cent., is a matter of no slight moment. That the danger lurking in the method adopted is not less than has been suggested is demonstrated by the fact, that although he had used substantially the same form of presentation for twelve years, so accomplished a statistician as Professor Adams was so far misled as to make the fictitious increase in capitalization between June 30, 1899, and the corresponding date in 1900 the basis of an unfavorable criticism of current methods of railway finance, although a closer examination of the figures presented on the adjacent pages of his report would have shown that the increase in actual capitalization was only 25.37 per cent. of that which was made the basis of the adverse comment. . . . There was an increase of \$457,080,062 in the aggregate obtained by adding the outstanding capitalization of all railway corporations, but \$341,137,182, or 74.63 per cent. of this amount, was

cancelled by the increase in the holdings of railway securities by railway corporations. The actual increase in capitalization amounted to \$115,942,880, or less than the amount which the statistician suggested as a suitable addition on account of the 4051.12 miles of new construction." American Statistical Practice, I. The Interstate Commerce Commission, Yale Review, August, 1902, pp. 176-7.

Professor Ripley fell into the error which he now repeats when he wrote the report on railway transportation for the United States Industrial Commission (Report, Vol. XIX., p. 401) and I called attention to the needed correction in an article entitled "The Industrial Commission and the Railways," which appeared in the Political Science Quarterly for December, 1902.

In the Yale Review article already quoted herein I ventured to predict that the error due to this form of duplication would become so great that a more reasonable method of compilation would have to be adopted by the Interstate Commerce Commission. I then said, in part:

"If the tendencies that have recently been most prominent in the development of inter-corporate relations in the railway field are maintained, the present method of dealing with capitalization in the annual reports will sooner or later have to be abandoned, for until a better method is adopted the error will constantly increase in proportion." American Statistical Practice, I. The Interstate Commerce Commission, Yale Review, August, 1902, pp. 177-8.

Senator Zeb Vance used to tell of a scarecrow that was so hideous that it made the crows bring back all the corn they took during the year before it was erected. The commission has recently and partially corrected its refusal to allow for this sort of duplication of par values, but there seems to be no method of correcting the erroneous statements of the past or of putting an end to their calculation.

H. T. NEWCOMB.

"THE TRUTH ABOUT RAILWAY ACCIDENTS."

CHICAGO, December 13, 1911.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

All railway men must feel indebted to the *Railway Age Gazette* for the article in its issue of December 8, page 1166, on "The Truth About Railway Accidents."

In the last paragraph you put your finger on the spot to which I have been trying to draw attention for several years when you said:

"The railway managers have been at fault in not promptly refuting the many misrepresentations regarding railway accidents and other matters that have been so generally made and widely disseminated."

Not only with respect to accidents, but with regard to other matters concerning which the public has been misinformed, railway managers have done but very little—nothing systematically—to set the people right. Even what they are doing today is in the form of a very scattering fire.

T. J. NORTON,

General Attorney, Atchison, Topeka & Santa Fe.

CHICAGO, ILL., December 11, 1911.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The article in your issue of December 8, "The Truth About Railway Accidents," prompts the writer to call attention to the manner in which some station platforms are constructed on double and four-track roads, viz., by placing one platform on the outside of one track where it logically belongs, but placing the other platforms between tracks without either increasing the track centers or providing suitable fence or railing to prevent one stepping in front of one train while getting out of the way of another. This location for a platform is bad enough when the edges of same do not extend nearer than 5 ft. from the center of the track, but it is much more dangerous when built up to the rails.

I presume this style of construction is put in on the assump-

tion that trains do not pass on adjacent tracks when people are getting on and off trains, but the fact is, as all who are observant can see for themselves, that trains frequently do pass, or if they do not actually pass each other right at the platform, it is often necessary for one to stand between trains in order to avoid missing the train he wishes to take.

For example: A northbound train which is scheduled to stop is approaching a station, and at the same time a southbound train is approaching which is not scheduled to stop. The southbound train is able to reach the station before the northbound actually stops, and consequently continues on its way at full speed, leaving the passenger to take his choice between standing on the narrow platform close to the moving train, or possibly missing his train entirely if the train he wishes to take does not choose to wait until the other train has passed.

While I do not know that the arrangement of the platform above described has been the cause of any large percentage of accidents, it does seem like a very dangerous arrangement and, with possibly few exceptions, entirely unnecessary. To the writer, platforms built *between and close to the rails*, look like an invitation to walk on the track, something which I believe we all will agree is undesirable any and everywhere.

RAILWAY SUPPLY MAN.

MOTOR CARS IN COLLISION.

OMAHA, Neb., December 14, 1911.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

Two 70 ft. McKeen steel gasoline motor cars recently met in a head-on collision with the damage to the cars illustrated in photographs. The speed at the time of the accident, which occurred on a sharp curve, was between 75 and 85 miles per hour. There was no loss of human life, and while some of the passengers sustained slight bruises, none of them nor any member of the crew suffered a broken bone. Notwithstanding the terrific shock the cars did not telescope and suffered no damage except to the pointed front ends and adjacent supporting and bracing members. The gasoline engines were not damaged and not a wheel of either car was derailed. Beyond the point where the steel structure shows distortion or disfiguration the car framing and roof sheets are all in perfect condition.

The features of the McKeen motor car frame which produce a construction of extremely light weight with such tremendous

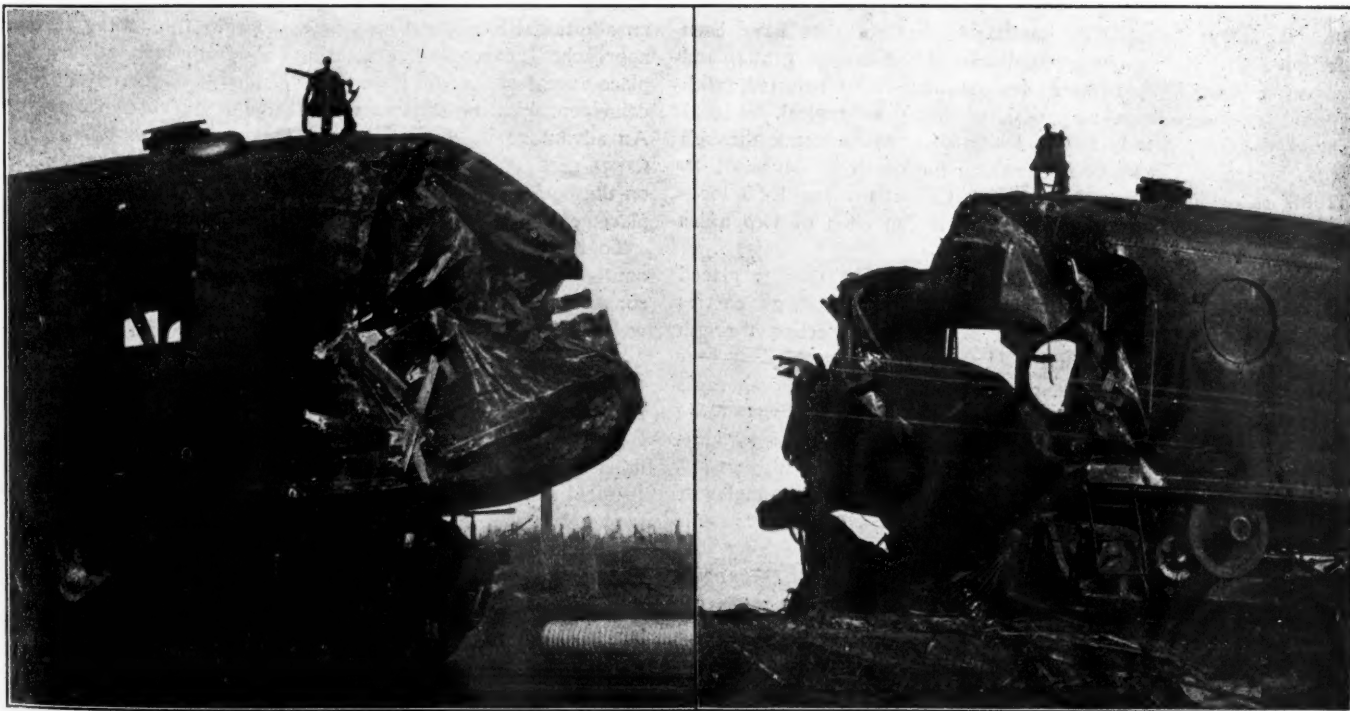
strength are the wedge-shaped front end with the round rear end; the single center sill I-beam connecting the forward with the rear end of the car; the steel channel side sills, which are continuous around the entire car; and the depressed side sill in the middle of the car, which enables a combination plate and truss girder to be worked out of the side of the car. Thus the sides of the car are utilized for carrying the weight and assuming the major portion of the stresses in case of impact. The distance from the side sill to the plate gives a depth of girder of about 8½ ft., which could not be obtained except by the use of the round windows, which enables the diagonal braces to run up to the requisite height.

There are no posts in the car, but there are ribs and stays similar to those of a ship, the channel iron sections extending from one side of the sill upwards, forming the posts, carlins, and posts on the other side of the car, tying all together and in combination with both the side sills. The rigid rectangular brace in the center and over the body bolster at the end affords much strength in this style of construction. The rigid triangular braces connecting the depressed side sills with the center sill are also a unique and very efficient feature of the car design. Therefore, in a collision the car has the whole metal cross section brought into play resisting the shock. Not only the sills, but the side plates, the steel siding, the roof, and all other metal forming a part of the steel frame assumes its proportion of the burden, whether it be a shock incident to a collision, or to stresses incident to a heavy load.

W. R. McKEEN, JR.,

President, McKeen Motor Car Company.

According to the *Berliner Tageblatt*, Germany's new West African territory is to be linked up with its East African territory by a service of motor cars across the continent, passing through the Belgian Congo. The connecting of different districts by a service of motor cars has already been tried with encouraging success in the Belgian Congo. New roads will have to be cut through forest and hewn out of mountainous country. Branches will have to be built and a considerable amount of organization will be necessary before the scheme gets into working order. Already a number of German engineers and military officers are surveying the ground and studying the best route. The new territory referred to is that just ceded by France to Germany in settlement of the Morocco dispute.



Ends of Two Motor Cars Which Collided at High Speed.

TYPES OF SHALLOW FLOORS FOR RAILWAY BRIDGES.*

BY O. F. DALSTROM.

In railway bridges of the through type, designed for crossings where local conditions do not govern the depth of the floor system, that depth is determined by sections that give the greatest economy of material consistent with simplicity of construction and facility of erection.

THE SHALLOW TROUGH FLOOR BRIDGE.

The floor beam usually determines the depth of floor in designs of open floor through bridges, whether truss or plate girder type. The term "depth of floor" will be used throughout this discussion to indicate the distance from base of rail to lowest steel of span. If considerations governing the design of the trusses produce panels of considerable length, the stringers, instead of the floor beams, may determine the depth of floor. A single-track truss span of 350 to 400 ft., with trusses 18 ft. 6 in. or 19 ft. centers, may have panels over 30 ft. in length. In such a design the economical depth of the stringer would be about the same as that of the floor beam. In common practice the floor beam would still be made deeper than the stringer to obtain simple details of connection between these members.

But conditions of grade and requirements of clearance below the bridge may make it necessary, in a measure, to disregard economy of material and simplicity of construction and erection to obtain designs that will meet all the requirements in special cases. Difficult conditions of grade under clearance, necessitating extreme shallowness of floor, are frequently encountered in crossings over streets and over other railways; and the type best adapted to any particular crossing must be determined by a careful study of the local conditions.

A crossing over another railway usually requires that the grades be carried above the normal grade of the line, with a through bridge over the railway at the apex of the grades. If the approach grades are long and heavy, the slightest reduction in the depth of the floor of the bridge means an appreciable reduction in the cost of the approaches. And—what may be of greater significance than the reduction of the cost of bridge and approaches—it means the reduction of grades that would be costly and otherwise objectionable, or practically impossible, from the standpoint of operation, where local conditions determine the limit of running out of the grade.

The files of the bridge department of the C. & N. W. contain the plans of a large number of bridges that have been designed to meet extreme conditions of clearance grade and curvature. A few of these designs have been selected, with special reference to shallowness of floor, as typical. Fig. 1 shows the floor details in the design of a double track through truss bridge of 170 ft. span, in which the depth of floor is 1 ft. 11 in. This bridge is designed for Cooper's Class E-50 locomotive; or a concentration of 60,000 lb. on each of two axles spaced 6 ft. 0 in. center to center.

The floor is of trough construction, the troughs being placed perpendicular to the axis of the bridge. Each trough carries a tie under each track, as shown in transverse section through troughs and floor beams in Fig. 1; the tie is supported at four points on horizontal angles riveted to the tops of diaphragms extending between the webs of the troughs. In every alternate trough, except those adjacent to the floor beam, special diaphragms are provided near the ends of the ties. To these diaphragms the ties are anchored by bolts through the horizontal angles at the tops of the diaphragms, which are so located in the troughs that the bolts will be about 4 in.—a convenient working distance—inside the guard rail. The horizontal legs of the angles at the tops are turned toward the ends of the ties to make the bolts accessible after the ties are put in place. The tie bolt diaphragms are omitted in the troughs adjacent to the floor beams, as they would interfere with the driving of the field rivets at the ends of these troughs.

The troughs (half-section, B-B), are carried by longitudinal girders which are parallel to the trusses, and placed at a sufficient distance from the lower chord to permit ready inspection of the chord and girder. The longitudinal girders are carried by the floor beams (half-section A-A), which are designed to receive the entire panel load and transmit it to the truss.

The troughs are designed to carry a concentration of 60,000 lb. on each track, each concentration distributed over two ties. This gives a load of 30,000 lb. on each of the two ties carried by the trough, or 60,000 lb. carried by the trough. The floor beam is designed to carry the load from the intermediate troughs, concentrated at the bearings of the longitudinal girders, 2 ft. 1 in. from the center lines of the trusses; and, in addition, to carry its part of the load on the ties in the adjacent troughs.

The heavy load carried by the floor beam, together with its greater length, requires in this member a section considerably heavier than that of the troughs. The depth back to back of angles is made the same in the floor beam and troughs, but the addition of flange material required to give the necessary section modulus in the floor beam, makes the extreme depth of this member somewhat greater than that of the trough sections. This extreme depth of floor beam determines the depth of floor for this type of bridge. By flattening the rivets under the rail and allowing a clearance of 1 in. from the base of rail to the tops of the flattened rivet heads, a satisfactory section is worked out with a depth of floor of 1 ft. 11 in.

It will be noted that the material in the floor beam and trough sections is not disposed symmetrically with reference to a horizontal line at the middle of the section. In order to obtain the most effective distribution of material, the neutral axis is maintained at the middle of the section. The metal is increased on the tension or lower side to make up for the reduction of section by rivet holes, no allowance for reduction of section by rivet holes being necessary on the compression or upper side of the section.

The depth of the longitudinal girders is made considerably greater than economic considerations require for the section. This is done to obtain a good detail at the end bearing and at the connection to the floor beam.

The top flange of this girder is unsymmetrical, being composed of a plate and an angle, the angle placed with its face against the web, the horizontal leg projecting over the top of the web and outward from the track. This detail of the top flange is to gain an additional horizontal clearance, as at this point the structure approaches nearer to the clearance diagram than at any other place except at the end post, where the edge of the cover plate is coincident with the extreme vertical line of the clearance diagram. An advantage in erection is also obtained by this detail of top flange section, as it permits setting the trough sections in place on the bottom flanges of the girders, with only a very slight displacement of the girders from their permanent position.

To further facilitate erection of the troughs, the stiffeners are omitted from the inner side of the longitudinal girder. The end connection angles of the troughs, which are field riveted to the web of the girders, are placed high enough so that the tie bolt diaphragms near the ends of the troughs will not interfere with the driving of the field rivets at the ends of the troughs in which the tie bolt diaphragms occur.

The troughs are drained through 1 in. gas pipes fitted into holes in their bottoms and projecting slightly below the trough to form a drip. This projection of the drain pipes must not extend below the line of low steel determined by the rivet heads on the under side of the extreme cover plate of the bottom of the floor beam. The upper ends of the drain pipes are threaded into washers to hold them in place. The lower part of the troughs is filled with asphalt mastic, the surface sloping toward the drain pipes and flashed over the washers at the upper ends of the pipes. A layer of broken stone covered with gravel is spread over the mastic for a protection.

The deflection of this floor under a maximum load is con-

*Read before the Western Society of Engineers, December 13, 1911.

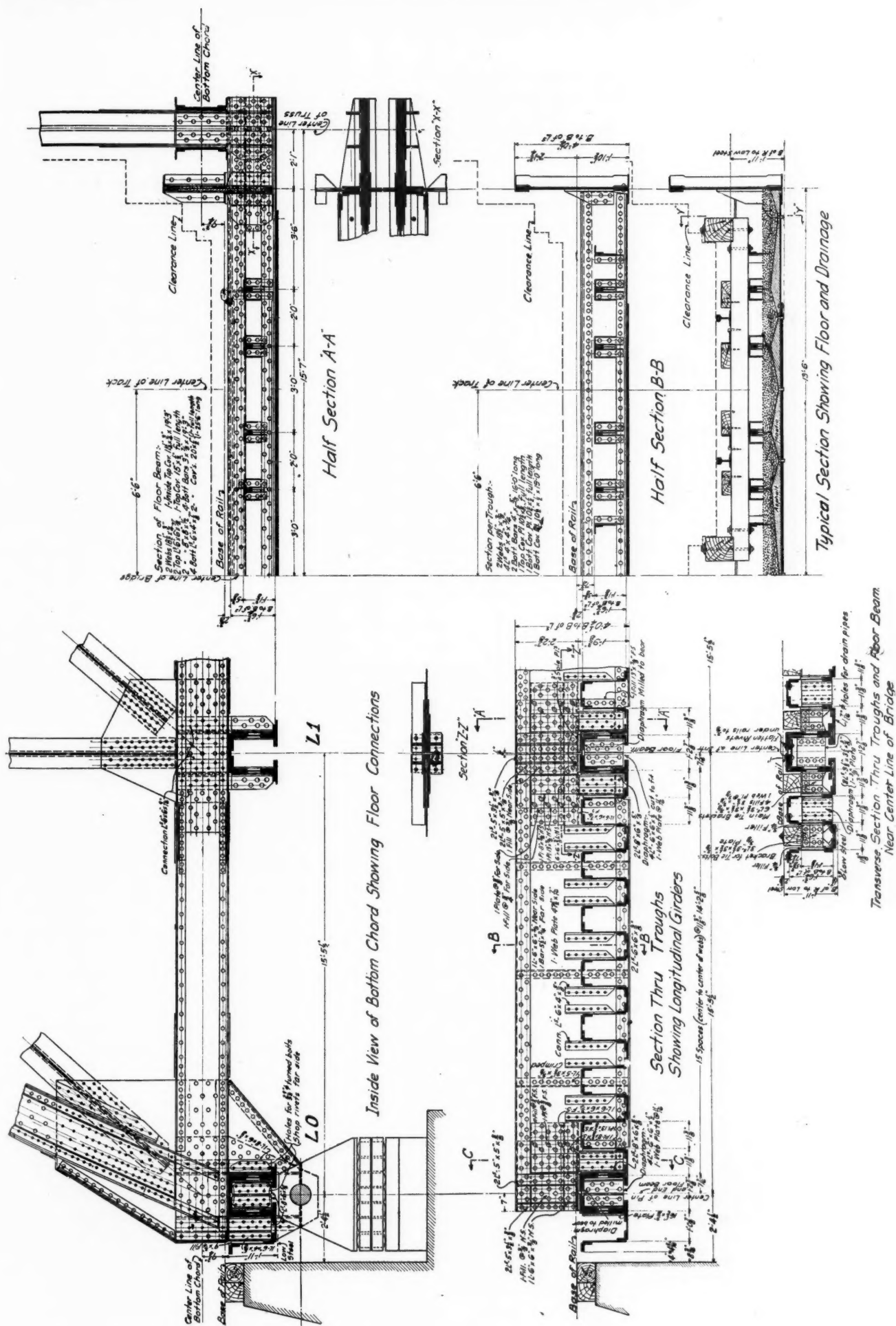


Fig. 1—General Details of Shallow Trough Bridge Floor.

siderably greater than that of floors designed for depths determined by economical sections. Under maximum load the theoretical deflection at the center of the floor beam is 0.65 in. The erection of truss bridges of the open trough floor type requires a special order of work in riveting, owing to the longitudinal girders being located so close to the trusses. After the girders have been placed in position, no riveting can be done on the inside of the lower chord opposite the girder. On this account all riveting in the trusses below the level of the tops of the girders must be done before the girders go into place, which means that all lower chord splices, floor beam connections to trusses, and web member connections to gusset plates, up to the level of the tops of the girders, must be riveted before placing girders and trough sections. There is no interference from the girder in driving the rivets on the outside of the truss, but these rivets, up to the level of the tops of the girders, should be driven at the same time that the riveting on the opposite side of the truss is done.

In the development of this type of shallow floor for double track bridges, the first efforts were directed toward obtaining an open floor design, with stringers beneath the track, transmitting the load directly to the floor beam. The excessive bending moment in the floor beam, resulting from this arrangement, made it impracticable to design a floor beam that would come within the required limits of depth of floor.

Following this, a trough floor type was designed, differing from the one shown on Fig. 1 in that it had no longitudinal girders to carry the troughs. Instead, the troughs were extended to the trusses and connected to the bottom chord in the same manner that the floor beam in Fig. 1 is connected to the chord at the panel point. The bottom chord was designed to act as a girder, to carry the panel loads to the panel points. This design brought the depth of floor within the required limits, but made the troughs excessively heavy. The bottom chord was necessarily made deep and heavy, since it had to act as a beam for the floor troughs at the same time that it was doing duty as a tension member in the truss.

The next step was the introduction of the longitudinal girder. This was placed as close to the track as the clearance diagram would permit, to reduce as far as possible the bending moment, and thereby the sections, of the floor troughs. The introduction of the longitudinal girder changed the bottom chord from a combined beam and tension member to a simple tension member, and eliminated from it the objectionable secondary stresses produced by the vertical loads applied at the trough connections.

Below are given a few figures for the comparison of a 170 ft. double-track span of the above type, and a double-track span of the same length, with the usual open floor construction, in which the floor beam and stringer sections are determined by the economical depth.

	Shallow Trough Floor Type.	Deep Floor Type.
Depth of floor	1 ft. 11 in.	4 ft. 9 in.
Weight of floor system per lineal foot of bridge..	5,000 lb.	1,700 lb.
Weight of trusses and bracing, per lineal foot of bridge	3,400 lb.	3,250 lb.
Weight of 170-ft. span, complete.....	1,496,000 lb.	900,000 lb.
Total cost of span, f. o. b. cars at bridge com- pany's plant, at \$0.025 per lb.....	\$37,400.00	\$22,500.00

Difference, \$14,900.00 = 66.2 per cent. of deep floor type.

As the depth of floor is increased, the weight diminishes rapidly. At 2 ft. 4¼ in. depth, the weight is 4,100-lb. per lineal foot of bridge. Further increase of depth would show a corresponding decrease in weight until the minimum thickness of material in sections is reached.

Unit prices in bids submitted by bridge companies for the fabrication of material for the shallow trough floor type have been found to run about the same as those submitted at the same time for open floor truss bridges. On this basis, a comparison of the two types of the span selected shows that the shallow floor type would cost, f. o. b. cars at bridge company's plant, about 66 per cent. more than the deep floor type. The cost per ton for

erecting would be about the same for both types. The number of field rivets per ton is somewhat less in the shallow floor type than in the other type; but an allowance, for which no figures are at present available, must be made for the order of procedure in riveting, which requires that part of the riveting be done before all the material in the bridge is assembled, and for the additional falsework and blocking that are necessary under the floor system to provide for the uninterrupted movement of the trains.

The comparison of costs of the two types erected would show about the same relation as that of the costs of fabrication.

The range of application of floors of this type in double-track truss bridges would cover depths of floor of about 3 ft. and under, if the panel lengths do not exceed 15 ft. With a depth of floor over 3 ft. an open floor bridge is practicable and would be more economical.

For double-track through girder bridges, where panel lengths can be varied as desired, the application would be limited to about 2 ft. 6 in. depth of floor.

THE SHALLOW OPEN FLOOR BRIDGE.

A design of open floor, double-track bridge, with 1 ft. 6 in. depth of floor is shown in Fig. 2. This is the plan of a bridge erected near Mapleton, Wis., on the new line of the M. S. & N. W. The design shown is for a double-track bridge, but the type is applicable to crossings with any number of tracks at the standard distance of 13 ft. centers. The limitation of this type of bridges is in the direction of span lengths, being suitable only for spans of less than 40 ft.

The relation of the clearance diagram to the girders shows that in the longer spans the girders and not the floor beams or stringers determine the depth of floor. The section of the middle girder, which carries load from both tracks, is exceptionally heavy, while that of the floor beams have no shapes over ¾ in. thick. In shorter spans, 20 to 25 ft., it would be possible to make a shallower girder and reduce the depth of the floor beam so that the depth of the floor would be about 1 ft. 3 in. At that depth the stringer would be so shallow that any further attempt to reduce the depth of floor would result in stringers so shallow and short, and floor beams so close together, that the floor would consist of floor beams connected by diaphragms acting as stringers. It would be approximating the type described above under the name of shallow trough floor bridges.

In spans of 15 ft. or less, the girders can be brought under the third offset of the clearance diagram, making the floor beams shorter and lighter. At this point the depth of floor would probably be determined by the stringer, and the floor beam would be designed in accordance with that depth.

THE RAIL GIRDER.

Fig. 3 is the plan of a girder designed to carry a track over a 4 ft. 6 in. clear span in places where there is not sufficient space for stringers and ties below the rail. Conditions requiring such designs are not uncommon in railway yards and in city streets, where pipes and conduits are laid close to the grade of the track.

This design consists essentially of an independent girder for each rail, built up of Z shapes and bars. Section E-E is a transverse section of the girder, showing the rail held in place by cast iron clips bolted to the webs of the Z's. The depth of floor is 3 in., using the term in the same sense as in the discussion of the previous types.

In the design of the girder it is assumed that both rail and girder will be effective in resisting the bending under load. They will act as separate units, however. Both rail and girder will be deflected the same amount, but as they are of different sections, the stresses in the extreme fibers will not be the same, but will be proportionate to the distance of the extreme fiber from the neutral axis in each case. This distance in the girder is 3 in. In the rail shown it is 2¾ in., or 0.96 of that of the girder.

The section modulus of the girder given below, Section E-E,

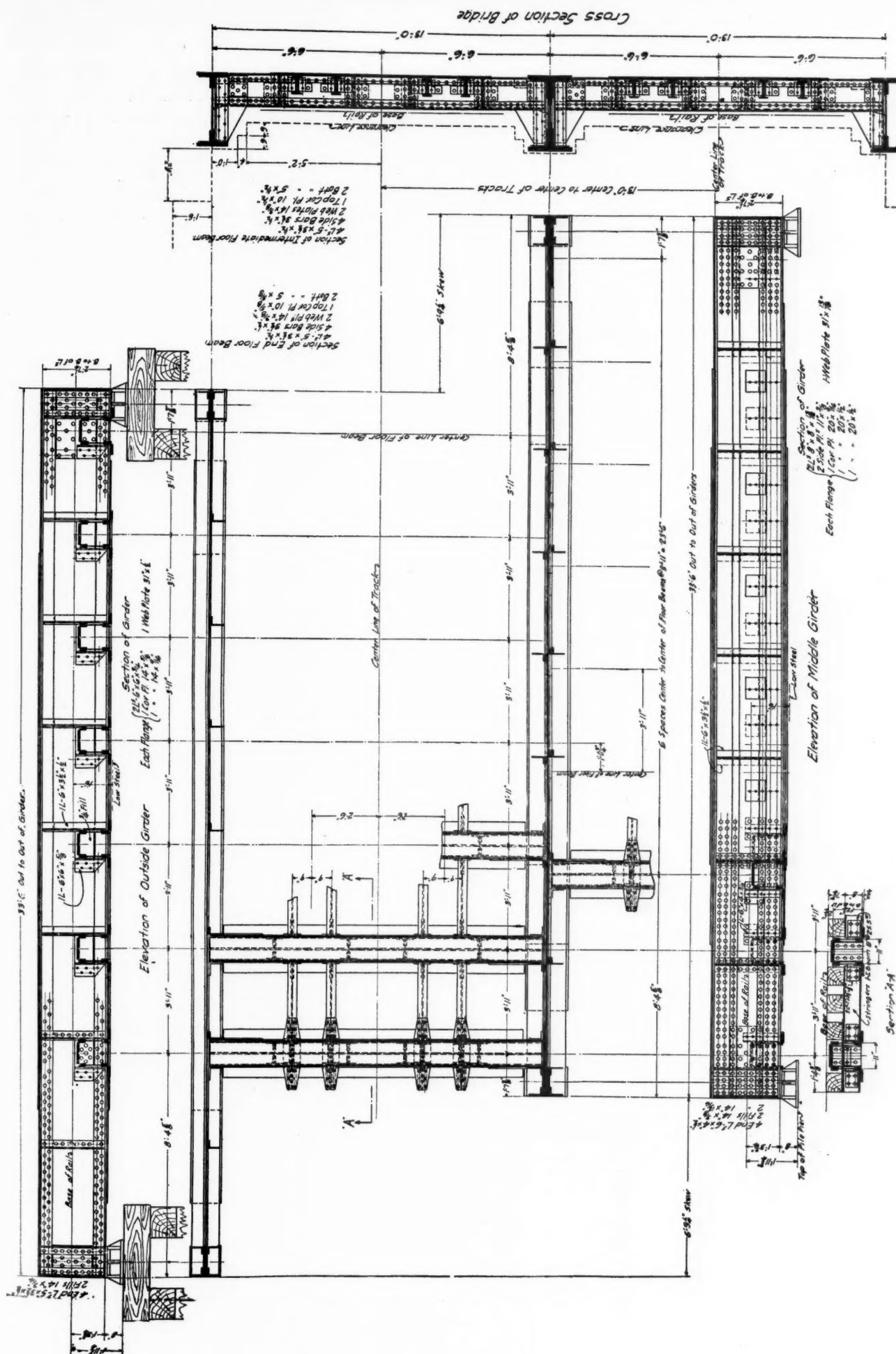


Fig. 2—General Details of Shallow Open Bridge Floor.

is the actual section modulus of the net section of the girder. The "effective" section modulus given for the rail is 0.96 of the actual section modulus of the rail. The sum is the effective section modulus of girder and rail acting as separate units, and deflected the same amount.

Assuming a span of 5 ft. 0 in. center to center of bearing under maximum load of 30,000 lb. at the center of span, the bending moment at center of span is 900,000 in. lbs., counting dead load and impact equal to live load. This gives a maximum fiber stress of about 18,000 lb. in the girder.

Section E-E shows a 90-lb. A. S. C. E. rail section, on the

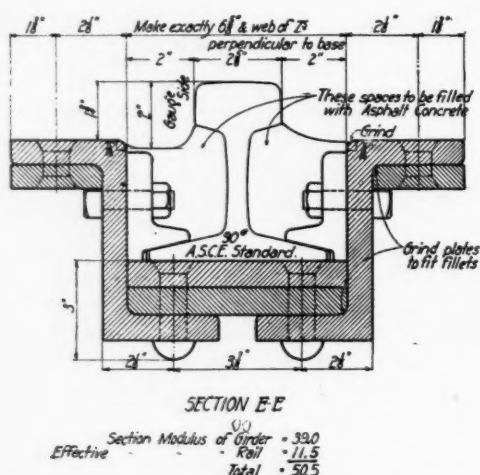


Fig. 3—Details of Rail Girder for Shallow Bridge Floors.

girder. Any type of rail can be used with the girder by varying the details of the cast iron clips to conform to the section of the rail to be used. The space in the girder on each side of the rail is filled with asphalt mastic, to protect the steel and provide a run off for drainage.

The weight of a pair of girders of the section shown in section E-E is about 1,500 lb. The weight of a pair of the special section is practically the same as that of the standard section.

EXTENSION OF TRACK PANS ON THE PENNSYLVANIA.

The recent decision of the operating department of the Pennsylvania Railroad to use four engines instead of three on east-bound trains between Conemaugh, Pa., and Gallitzin has made it necessary to increase the length of the track pans in the two east-bound tracks at Wilmore from 1,800 ft. to 2,600 ft., and the work of extending these pans is now under way. This water station is located 11 miles east of Conemaugh and 12 miles west of the summit of the heavy grade against eastbound trains rising from Conemaugh. It is probably the largest individual water station in the country, as over 2,250,000 gallons of water are used there daily.

In this connection it is interesting to note the provision which it is necessary to make to allow locomotives to take water on this exceedingly busy four-track line. Two alternate plans are in use at different points on the part of the line in question. At some places track pans are provided so that the trains will take water while in motion; or they may be brought to a stop and supplied with water from standpipes. However, the stopping of a train on the main line long enough for four engines to take water from standpipes will ordinarily result in tying up several other trains behind it and soon blocking the line. For this reason when water is taken from standpipes it becomes necessary to construct several sidings on which freight trains can head in and several trains take water at the same time. At Denholm on the Middle division and Thorndale on the Philadelphia division, both of which points are also coaling stations, such a plan has been adopted, twelve side tracks being provided, on which as many trains can take water at the same time.

OPPORTUNITIES FOR ECONOMY ON RAILWAYS.

BY L. C. FRITCH, C. E.*

II.

MATERIALS AND SUPPLIES.

The railways of the United States on June 30, 1909, according to the report of the Interstate Commerce Commission, had on hand material and supplies to the value of \$206,849,619. The interest alone on this amount, at 5 per cent., is \$10,342,481 per year. But this is not the only item represented in the cost of carrying this stock. There should be added depreciation at from 6 to 12 per cent., obsolescence, or loss from such causes as make the material unfit for use owing to changes in standards or materials, making necessary the disposition of such material at scrap values, and waste which affects many items of material and supplies.

Adding all these items together, the cost of carrying material and supplies on hand is variously estimated at from 20 to 25 per cent. Using the lower figure, the cost to the railways for carrying material and supplies on hand would be \$41,369,924 a year.

The interesting question is: To what extent can economy be effected by reducing this annual cost?

Taking the entire mileage of roads, the average amount of materials and supplies per mile of line was \$880. Does this represent the minimum amount of stock that it is practicable to carry on hand? To determine this question we must first establish what is a reasonable period for which supplies should be carried to meet practical requirements.

Measured by the annual expenditures for material and supplies, it is estimated that the amount carried on hand June 30, 1909, represented about four months', or 120 days', supply. There are some items of which a six months' supply is necessary, and others of which a thirty days' supply is sufficient. If, on the average, three months' supply is ample, then the present supply is 25 per cent. greater than is actually necessary.

On this basis the over-supply for the period named would be \$51,712,405, which costs for carrying, on the above basis, \$10,342,481.

There is great diversity in the amounts of material and supplies carried, as is shown by the following statement of a number of representative lines:

MATERIAL AND SUPPLIES ON HAND JUNE 30, 1909.

Road No.	Mileage.	Amount.	Per mile of road.	Ratio per mile to opr. expense per mile of trk. Per cent.
1.....	2,233	\$4,043,817	\$1,811	14
2.....	10,178	10,669,440	1,048	20
3.....	2,610	7,111,778	2,724	16
4.....	2,003	3,406,911	1,703	10
5.....	3,474	4,958,972	1,427	12
6.....	957	2,654,306	2,774	13
7.....	2,392	3,325,423	1,400	10
8.....	1,394	2,084,199	1,500	11
9.....	5,299	11,689,285	2,206	10
10.....	591	1,270,410	2,150	12
11.....	1,476	2,331,178	1,578	7
12.....	1,575	3,058,778	1,942	11
13.....	1,792	2,244,634	1,252	12
14.....	1,942	2,576,612	1,327	14
15.....	1,345	2,982,599	2,143	11
16.....	1,420	2,013,749	1,418	9
17.....	7,050	4,375,468	625	13
18.....	2,515	1,080,483	430	6
19.....	1,703	1,588,703	934	11
20.....	4,598	3,697,634	805	12
21.....	1,230	1,426,878	1,160	17
22.....	4,577	6,546,055	1,432	17
23.....	10,075	8,588,838	859	14
24.....	7,638	5,829,863	763	12
25.....	8,948	5,882,191	659	11
26.....	7,481	6,127,702	820	16
27.....	7,129	6,352,444	890	19
28.....	5,698	6,166,686	1,082	17
29.....	7,393	5,495,263	744	14
30.....	3,384	8,359,444	2,473	36
31.....	10,294	9,561,451	928	11
All Railways in the United States ...	235,402	206,849,619	880	13

By multiplying by two the percentage in the last column, which is the ratio above named between material on hand per mile of

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road and operating expenses per mile of road, the approximate fraction of a year's supply is derived. This is based on the general theory that about one-half the operating expenses cover material and one-half labor. Thus, taking a road which shows 17 per cent., the amount of material on hand is about four months' supply. The average for all roads is about three months' supply. The minimum is about one and one-half months and the maximum eight months. Therefore, it is assumed that any road showing a percentage over 12 is carrying a larger supply than roads generally find it necessary to carry.

One railway may show a large value of supplies carried per mile of road, but on account of large density of traffic and heavy operating expenses, may show a lower percentage and therefore a smaller comparative stock on hand. Thus the road showing the largest value of supplies carried per mile of road, \$2,774, only shows a ratio of 13, or the average for all the roads in the United States, while another road having only \$890 per mile of road, has a ratio of 19, the first road having 94 days' supply, while the last has 128 days', or 50 per cent. more.

Value of supplies carried per mile of road is not a fair criterion of the amount of material required to be carried. The volume of traffic, source of supply and many other factors enter into the problem.

However, where a large system with dense traffic is able to operate with a supply of \$1,000 per mile and another system of equal mileage and traffic shows \$2,000 per mile, it is safe to assume that the latter is overstocked and there is room to economize in this particular.

The reason for the wide variation in the practice of roads is largely that the store department on some lines is not organized in a way and conducted on lines that are commensurate with its importance. In order to keep supplies within proper limits the necessary statistics must be kept and checks applied daily to hold the various elements within reasonable bounds.

The writer believes that the best practice requires that the store department be kept entirely independent of the operating department, in order that it may properly exercise its authority over the stock without the prejudice and influence which subordination naturally involves. The officer in charge of the stores department should be the purchasing agent, who should report directly to the president, or an executive officer, and directly under the purchasing agent, the general storekeeper, whose duty it should be to supervise the ordering of supplies on duly authorized requisitions, but whose constant aim should be to keep the stock at the minimum consistent with reasonable requirements. Division storekeepers should be responsible to the general storekeeper, as far as the maintenance of stocks is concerned, and to the operating officers as to its disbursement.

There is a tendency to always be on the safe side and order "enough and more" for good measure. The over-plus often represents waste or stock returned to be carried indefinitely and ultimately to find its way into the scrap pile.

One of the causes of over-ordering is the large amount of rush work on railways. It proceeds along these lines: A certain piece of work is contemplated. It must be done at once. Estimates and plans are hurriedly gotten out. Many items are mere guesses. From 10 to 15 per cent. is added to cover contingencies. The material is ordered in the same hasty manner.

Another familiar procedure is to plan a certain piece of work, estimates being carefully made and every detail being covered. The work is not decided on for some time. Then changes are made, altering the plans so carefully prepared. Suddenly an order comes that the work must be done at once. Rush plans and estimates are made and percentages added, and the result is that more material is bought than a careful management would have required.

Another cause of overstocking is the cutting down of requisitions. The blue pencil is responsible for more money wasted through over-supply than it has ever saved by cutting down requisitions. It does not take long for the average man to find

out that requisitions are cut, with the inevitable result that orders are padded with the expectation of their being cut down. If they should then escape the blue pencil over-supply results.

If men were taught to order only what is reasonably required, and a check were kept on the quantity of supplies of each kind carried and a mark set beyond which supplies must not go, our material supply would be greatly reduced.

The question of quality of material is an important one and is often overlooked and price is permitted to be the governing consideration. "The best is always the cheapest," but rarely, if ever, is the cheapest the best. Many times a quality of material is used where a much lower grade would answer all requirements, but this question should be determined by the user and not by the purchaser of the material. Recently it was observed on an important railway that first-class treated ties were being used in side tracks where second-class untreated ties would answer every purpose at one-third the cost. Doubtless on some points on this same railway second-class untreated ties were used in important main lines. This is flagrant misuse of material, which is one of the evils practiced to an alarming extent.

The quality of material desired for specific purposes should be stated in plain terms in the specifications, no room being left for doubt in the minds of the purchasing officers. If it is possible to secure "something just as good" it should be substituted only after consultation with the officer who ordered the material. It will be found that those railways secure the best materials at the lowest cost which have well prepared specifications and which have an established system of inspection which insures getting the material ordered under the specifications. The railways which lack such system are apt to get the material rejected by other roads.

There is a distinct loss in the use of poor material in any work on railways. The cost of labor is steadily increasing; it forms a large proportion of the cost of work; and as the cost of applying poor material is as great as, if not greater, than that of applying first-class material, the saving made by buying inferior material is more than offset by the labor cost resulting from frequent renewals due to the poorer quality.

This principle finds so many applications in railway work that illustrations are unnecessary. One, however, may be mentioned. The renewal of ties is one of the largest items in maintenance of track. An order for several hundred thousand ties may be awarded to a low bidder on a margin of 1 or 2 cents per tie less than that quoted by a responsible firm. When the order is finally filled it will develop that ties of an inferior character are furnished, being undersized or old stock rejected by more rigid inspections, and the result is from one to three years' less life in track than would have been secured from the superior article which might have cost 2 cents per tie more. The inferior tie will probably have a life of six years, while the superior one would last eight or nine years, or nearly 50 per cent. longer. Cases of this kind are not mere suppositions, but are actually found in practice.

There is great abuse, or misuse, of material. When ordering, its purpose must be kept clearly in mind and all orders properly superintended by a competent authority. The system on many large roads is to have some clerk in the office of last resort censure the orders. He may be competent to pass upon quantity, and may arbitrarily reduce the amount ordered; but rarely is the quality made the subject of intelligent review. As much might be saved in intelligent review of quality as of quantity.

It should be a feature of every department organization that its orders should be faithfully and intelligently reviewed by a responsible head, and that strict economy should be practiced in the matter of quantity and quality of material ordered, its purpose being always considered as of first importance. Full and complete information is necessary on orders to enable purchasing officers to intelligently and economically discharge their duties.

One of the principal causes of large stocks of materials is the

lack of proper and reasonable standards regarding devices, methods and practices. A settled policy and well-established standards, which have been thoroughly tried out, reduce the stock to be carried. A road which lacks standards and a settled policy soon acquires a multiplicity of types of various kinds, which make necessary the carrying of large stocks to meet requirements of renewals and repairs.

Take, for illustration, repairs to locomotives. The cost of this item will be found to be greatest on roads having the greatest number of types of locomotives in use. There are on most roads from six to ten types or classes of locomotives in freight and passenger service, respectively, while the classes of services are at most three in passenger and three or four in freight service. In other words, there are as a rule about twice the number of types that are necessary under an established policy of reasonable standards.

The same remarks apply to freight cars; a multiplicity of types makes it necessary to carry large stocks of material for repairs and renewals.

Over-supply, or what may be termed over-insurance, is often resorted to, resulting in an economic waste. We must certainly provide for the future, but in how many instances do we provide for 100 per cent. insurance when 25 or 50 per cent. will answer? The investment made over and above actual requirements represents dead capital and brings no returns. We build 100,000-lb. capacity box cars and use them in handling merchandise with a lading of 10,000 to 12,000 lbs., when prudence would have dictated 60,000 to 80,000-lb. capacity cars as answering all requirements of the traffic handled. We limit bridges on lines of moderate traffic to carry maximum axle loads of 60,000 to 65,000 lbs., when 50,000 to 55,000-lb. loading would be good practice.

There can be no criticism offered against absolute safety, but when a certain point has been reached, an expenditure beyond that becomes extravagance. Good judgment consists in determining that point.

Proper supervision over the stock of material and supplies carried requires that statistics shall be kept in such a manner that tendencies to over-supply may be promptly detected and necessary remedies applied. Reports, to be made monthly by each department and by each division store keeper, and consolidated by divisions and finally for the system, are suggested below. These reports should be made through the auditor in order that they may be properly checked and represent accurately the amounts of material and supplies as shown on the balance sheets of the company:

MATERIAL AND SUPPLIES IN STOCK.

MAINTENANCE OF WAY MATERIALS.		
Item.	Value.	Day's Supply.
Ties
Rail
Frogs and switches
Bolts and nuts
Spikes
Lumber—miscellaneous
Other track material
Tools
Bridge material
Building
Signal and interlocking material
Water supply material
Scale material
Stationery
Miscellaneous supply
Material in temporary tracks.....
Scrap material
MAINTENANCE OF EQUIPMENT MATERIAL.		
Axles, wheels and tires
Iron and steel
Iron and steel castings
Car couplers
Flues, pipes and fittings
Bolts, nuts and washers
Nails and rivets
Brass, copper and tin
Oil and waste
Paints, varnishes, etc.
Air brake material
Lumber
Manufactured material
Articles in process of manufacture
Tools
Scrap materials
General merchandise

Item.	Value.	Day's Supply.
Fuel—coal
" —wood
" —oil
Stationery
MISCELLANEOUS DEPARTMENTS.		
Ice
Cafe car supplies
Stationery
Tools
Merchandise
General supplies

Reports of the above nature, accurately and promptly rendered and faithfully reviewed by a competent authority, will tend to keep in check the material and supply account.

Another important element in the proper care of material stock is the keeping of proper inventories. Each department, sub-department, storeroom and shop should at all times have an inventory which should be kept posted up to date and should balance with the monthly material report above recommended. There should be an exchange of inventories between the storehouses and shops of the various divisions, and no supplies should be ordered that can be transferred from one department or division to another. The "Chinese walls" surrounding division store-rooms and shops should be torn down, and an exchange of supplies freely made between various parts of the whole system. In this way stocks can be kept down to a minimum and often rush orders can be filled from other parts of the road.

The results secured on roads which have developed modern and scientific methods of handling the stores department are astonishing, and those roads which have given the matter the best attention show the lowest average stocks of material and supplies on hand.

The railways are the largest purchasers of supplies in our industrial life, consuming from \$700,000,000 to \$800,000,000 worth of material annually. An investment by any road of 1 per cent. of its material bills in proper supervision over its conservation will net a saving of nearly 10 per cent. We must surround this large expenditure with every reasonable safeguard and check; and results can only be secured through intelligent, constant and competent supervision.

FOREIGN RAILWAY NOTES.

The president of Nicaragua approved on August 5, 1911, the contract submitted by the representatives of the United Fruit Company for the construction of a railway from Bluefields Bluff north to the Cooringwar river, and passing on the west by the Lagunda de Perlas. The term of the concession is 85 years, after which time the railway is to become the property of the state.

The Argentine government will soon submit a project for selling the line built from Diamante to Curuzu Cuatia to the Entre Rios Railway. It is not improbable, therefore, that the government will hand over the concession to the Entre Rios Railway, with the condition that the company refund the amount already spent. The total cost of the line is estimated at about \$10,000,000. The government believes that the line will be better managed in the hands of the Entre Rios Railway.

The extension of the Argentine North Eastern Railway from Santo Tome, Argentina, to Posadas, about 98 miles, was provisionally opened for traffic as far as Apostoles in August, 1910; and on May 1, 1911, as far as Posadas. On June 30, 1911, 1,200 men were at work, and embankments and cuts had almost been completed according to the plans. The floods of last May, however, have shown the necessity of heightening the embankments for a distance of 6 miles in the Pindapoy valley. This work is now under way. Already 97.7 miles of main line and 2.6 miles of sidings have been laid. The line has been ballasted with stone or gravel for 30.6 miles and with earth for 31.8 miles. Nine bridges have been finished, and work on the two remaining ones across the Pindapoy and Pindapoy Chico is well advanced. The smaller bridges and culverts have been finished throughout a distance of 73 miles.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.

The winter meeting of the Association of Transportation and Car Accounting Officers was held at Louisville, Ky., December 12 and 13, with 100 members present, and President G. W. Taylor in the chair. Edmund F. Trabue, counsel for the Illinois Central and the Chicago, Indianapolis & Louisville, made an address emphasizing the value of the bureau method of administration of the demurrage rules.

The report of the executive committee indicates a membership operating 246,608 miles and having in service 2,443,894 cars. Changes were proposed in the constitution and by-laws to be finally passed on at the next meeting. The American Railway Association was requested to authorize the publication in the Official Railway Equipment Register of a complete list of private car companies that have accepted the assignment of reporting marks made under authority of the American Railway Association.

The association concurred in the opinion of the Committee on Car Service that it is not necessary to handle tank cars of railway ownership under instructions of the owner in manner similar to the method of handling tank cars of private ownership. In connection with the report of the Committee on Car Service a reference was made to the practice of certain roads putting embargoes on the movement of their cars to certain connections. This precipitated an interesting discussion in which many methods were advanced with a view to either protecting the car owner by the return of its cars, or by providing it with a number of cars equal to the number owned. The discussion culminated in the adoption of a resolution asking the co-operation of the American Railway Association in arranging a meeting of representatives of railways to make rules to govern handling of cars.

The recommendation of the committee with regard to a proposed change in Rule 7, code of per diem rules, requiring the short-routing to owner of cars of railway ownership that are in a condition "unsafe to load," at a reciprocal rate to be apportioned amongst the lines handling the car on its last movement from the rails of the owner, was returned to the committee for further consideration.

The association adopted for submission to the American Railway Association the proposed new rule, to be added to the per diem code, providing for the payment of per diem on new cars of railway ownership en route empty from builder to owner under filed tariffs, the same to be subject to reclaim. The association also adopted for submission to the American Railway Association the recommendation of the committee that Rule 8 of the code of per diem rules be eliminated from the code. The rule at present provides that the road holding a car awaiting the receipt of repair material from the owner may reclaim from the owner the per diem charges for the days accruing until receipt of material.

The committee reported the election of C. P. Dugan (Norfolk Southern) to fill the vacancy caused by the election of J. M. Daly to the second vice-presidency.

The Committee on Office Methods and Accounting reported that 235 private car owners have adopted reporting marks as assigned by the committee and are applying the same to their cars. The plan of the committee in this connection contemplates a separate and distinct set of marks for each private line of cars, for the purpose of preventing confusion in identifying ownership. The list was adopted for submission to the American Railway Association as a report of the progress being made by this association in accordance with resolution of the A. R. A. in May, 1910.

The association concurred in the opinion of the committee that it is unnecessary to issue junction cards showing both the receipt and the delivery of cars.

There was a long discussion on the self-transcribing system of interchange reports and train reports (such as that described in the *Railway Age Gazette*, December 8, page 1177). The matter was returned to the committee for further report.

The association concurred in the opinion of the committee that it is unnecessary at this time to recommend a change in form H, standard per diem summary sheet of the American Railway Association.

The Committee on Railroad Business Mail reported that the second assistant postmaster general had prohibited the carriage of letter mail by a railway acting as an intermediate carrier for other parties.

The Committee on Conducting Freight Transportation reported that in accordance with its recommendation in June, 1910, the Master Car Builders' Association has increased the rates for re-weighing and re-stenciling all cars other than stock cars to 75 cents a car and \$1 a car for weighing and re-stenciling stock cars. The committee also reported that in accordance with its recommendation, the American Railway Association has modified Rule 3 (f), code of car service rules, by eliminating the words "and Per Diem." This rule provides for the short routing of empty cars under a reciprocal rate and has previously provided for the payment per diem as well as the reciprocal mileage rate by the road for which the service was performed.

The transportation rules for the handling of perishable freight presented by the committee were returned to it with the request that a circular embodying these rules be mailed to each member to afford all roads handling perishable freight an opportunity to make suggestions in connection therewith, such suggestions to be considered by the committee in preparation of a further report.

The committee advised that in accordance with its recommendation, the American Railway Association has adopted a resolution requiring that car door fastenings should be located normally 5 ft. above the top of the rail, but not less than 1 ft. above the floor of the car, this action to apply to all new cars put in service and whenever it is necessary to replace fastenings on old ones.

The association adopted the recommendation of the committee for submission to the American Railway Association, providing that the proper transportation officer of a line setting a car back to another road shall notify the proper transportation officer of the delivering road promptly of the car initial, number, date, time delivered and cause of "set back," to the end that each case may be investigated and a proper remedy applied.

The Committee on Conducting Passenger Transportation as a matter of information presented the results of operation of a passenger car propelled by electric power, generated by a storage battery in service on a branch line of light traffic, as follows:

The branch on which this car is used is 2.3 miles long, with a maximum grade of 1.78 per cent. Eighteen trains are operated between the hours of 6 a. m. and 6 p. m.

The car has single trucks and is equipped with Edison batteries (weight complete, including batteries, 13,000 lbs.), with seating capacity of 26 passengers.

The car is designed for a maximum speed of thirty miles per hour.

It was put in service April 24, 1911, since which time the schedule has been maintained without interruption, and no connections delayed.

It makes approximately forty-five miles a day; average maximum speed, 25 miles an hour.

The average cost of operation to date is as follows:

Cost of car complete, \$6,550. Interest and depreciation estimated roughly at 20 per cent. per annum amounts to \$1,310 per year, and it is estimated there will be a natural maintenance charge of about \$300 for the first three years, after which it may be necessary to renew some of the battery elements; therefore it is estimated that the average charge per day for interest, depreciation and maintenance is approximately \$4.68 per day, to which should be added the cost of train crew and power, i. e., \$8.13; making a total daily cost, inclusive of maintenance, interest and depreciation, of \$12.81, as compared to a daily cost of the steam service displaced of \$42.68 (exclusive of maintenance, interest and depreciation). And more satisfactory service has been given.

One charging will run the car approximately 75 miles, and it takes about three hours to charge it, if charged at one charging. Electricity is being secured temporarily from a local trolley company at 4 cents per kw. hour. The trolley voltage to be available for car use is reduced by resistance grids, which is a satisfactory method where only one car is in service, but is not suitable for a number of cars on account of the resistance loss of energy. If conditions were such that power could be secured at proper voltage, the cost of current would be about 50 per cent. less than is included in the figures above presented.

This is in the nature of a preliminary report. The successful operation of the car under adverse weather conditions is yet to be demonstrated.

The committee also reported that it had been requested by

the American Railway Association to formulate a complete set of rules and blanks for the interchange of passenger equipment.

The Committee on Joint Interchange and Inspection Bureaus presented a thorough report covering the methods in use at the Union Stock Yards, Chicago, in connection with the joint inspection and interchange bureau in effect at that point. The committee also advised of the status of the inauguration of joint interchange and inspection bureaus at other points of the country where the matter is under advisement, viz., the entire Chicago switching district, Kansas City, Denver, Des Moines, Atlanta, Birmingham, Memphis, Peoria, Cincinnati and New England.

The next meeting of the association is to be held at the Hotel Champlain, Bluff Point, N. Y., June 25 and 26, 1912.

TERMINAL BRAKE TESTING.*

BY F. B. FARMER.

As we seek efficient train brakes and as the standard set by law is based on the train, it is obvious that terminal brake tests of trains must be made. Stated differently, the requirements can not be met by confining inspecting, testing and repairing to shops and repair tracks. Consideration of overtime and the sixteen-hour law, as well as expeditious train movement demand the minimum lapse of time between that for which the crew is called and the time the train departs. Hence, a train prepared for departure should require no more brake work after the engine is coupled than, at the most, stopping a few leaks in hose couplings and making the formal test. But often there are greater delays due to making other repairs, or the train proceeds with less efficient brakes than it should have. To avoid this, the repairs required must be determined with arriving trains. The incoming engineer should add to the reduction required for stopping enough to fully apply the brakes, and the brakeman should await his advice that this has been done before cutting off the engine. Car inspectors should be present to make an immediate examination and to bad order all defective brakes. Such repairs as ordinary brake pipe leaks, defective hose and wrong piston travel, which require little time, should be made, but cars requiring heavy brake repairs should be marked for the repair tracks.

Here is where judgment must be exercised, as perishable or other very important loads, as well as empties needed at once for such lading, must not be delayed. Neither should other less important cars be held in numbers far greater than the local force can repair in a day if such force is as great as the regular amount of work, including such repairs, would keep busy. The car foreman and the yard master should consult to adjust this, but when the former removes bad order marks without repairs having been made, he should fill out and apply an air brake defect card to better insure prompt repairs at the earliest practicable date. However, it does not follow that the repairing of defective brakes cannot be done without delay to cars which should go forward promptly. The Minneapolis, St. Paul & Sault Ste. Marie has largely solved this problem at an important terminal yard by assigning a short track in the yard for air brake repairs to such cars. With a few men and the necessary repair materials, such cars are often ready for the first train out, are never actually delayed, and few are allowed to go forward without repairs. This is but one detail of a very comprehensive scheme of improvement in freight brake maintenance effected by this road.

As one repair point on a large system cannot maintain all freight car brakes, it is obvious that each terminal should do its share, but this does not mean that other than the outgoing test should be made on through trains at the points with small facilities. A brake well repaired will go for a long period without becoming defective, but the too common failure to do so is due to inadequate repairs. To reduce the cost of brake cleaning by leaving cylinders and auxiliary reservoirs loose on the car is to

insure leaky pipes. The same result follows if the brake pipe and retaining valve pipe are not well secured. That most serious fault, brake cylinder leakage, will develop sooner than it should, sometimes immediately after the cleaning, unless a suitable lubricant is employed and packing leathers are replaced when a good inspection and a careful test would show that they should be. The practice often followed of cleaning and testing triple valves on the cars cannot insure good work. Neither is it common practice to test hose with soap suds while under maximum pressure and remove those found porous, or to examine the retaining valve weight and clean the case and small vent port. Until these and other details are given better attention in shops and on repair tracks, it will not be possible to effect the economy in time and money in terminal brake testing and the consequent repairs that will otherwise follow.

The M. C. B. requirement that cars in interchange must have retaining valves should imply the maintenance of this part and its pipe by the owning road. It is not sufficient to say that the mountain road may make needed repairs at the owners expense, as this means undue delay to traffic. However, inspections show that the average efficiency of brakes is otherwise much lower on the cars of level grade roads, a condition for which there is no warrant as that for the average mountain grade road is enough below 100 per cent. efficiency to justify making it the minimum.

That the regular terminal test of freight train brakes misses many of the defects which nullify the object sought in attaching air brakes, is conclusively demonstrated by the following: Within a few months competent parties made a test on several freight trains at the summit of a mountain grade, following a similar test by regular inspectors at the preceding division terminal, and out of which trains bound down this grade were supposed to leave with 100 per cent. efficient brakes, based on such test. The tests consisted of charging to 70 lbs., making a service reduction of 15 lbs. and rapidly examining for any brakes failing to apply or leaking off and incorrect piston travel. To show conclusively the oversights of the ordinary terminal brake test the infallible thermal brake test was made on each train at the foot of the grade. The customary plan was there followed of considering three cars with "warm" wheels equal to one with "normal" wheels; that is with a good brake. In addition to showing the results in percentage, they are given in "tons per good brake," derived by dividing the train tonnage by the number of good brakes.

The first train was a test train and had 2,501 tons. The other six were regular trains and ran from 2,252 to 2,367 tons, averaging 2,286 tons. Each train had a considerable percentage of foreign cars. No tests of or repairs to retaining valves were made.

Per Cent. Good Brakes by Test.		Tons per Good Brake by Test.		Cars per Train.
Standing.	Thermal.	Standing.	Thermal.	
97.7	68.8	42.6	59.5	61
91.0	75.0	45.0	54.6	56
100.0	60.0	40.7	67.6	58
98.1	53.7	42.5	77.6	54
98.1	52.8	43.8	81.5	53
96.4	53.5	41.7	75.0	56
88.9	67.2	46.2	61.2	55

The big returns from good brakes are mainly concealed, consisting of the more expeditious train movement they make possible and the avoidance of accidents, neither of which can ordinarily be shown in dollars and cents. Their observable expenses, consisting of initial cost, maintenance, flat and cracked wheels and delays to cars and trains for brake testing and repairs, are so readily seen and tabulated as to generally render even more obscure their great but intangible credit account. The pressing need is for a more accurate and practical appreciation of the fact that good brake maintenance is economy and for better directed efforts toward improved brake maintenance with a minimum increase in time and money spent. In this the active cooperation of the yard master and the superintendent will aid greatly. Too often their efforts are directed toward showing why trains cannot be held or switching done for brake work, rather than how to accomplish the desired results with the least delay or additional switching.

*Abstract of a paper read at the December meeting of the Western Railway Club, Chicago. Mr. Farmer is a representative of the Westinghouse Air Brake Company.

While there is no question concerning the imperative need of available air pressure in car shops and on repair tracks, it is debatable as to whether it pays to pipe yards. I believe that usually it does not. If locomotives have insufficient air compressor capacity to charge their trains without material delay, they are not prepared to handle the trains safely, economically and expeditiously between terminals. Following the plan of having the brake test on incoming trains, and subsequent disposition of cars with defective brakes, will leave little need for a yard air test plant. The only safe or available time for inspectors to work on cars in yards is for a limited period after the arrival of trains and again following attachment of the outgoing locomotive.

In seeking means for testing and repairing air brakes without loss of time in transit, extra switching, or danger to workmen the possibilities of the freight house tracks should always be investigated. Where the number of cars per day is considerable there is no doubt that the tracks should be supplied with compressed air and full advantage taken of this excellent opportunity for locating and remedying air brake defects. In line with this idea of conserving time and switching, it is recommended that all cars in shops or on repair tracks, and having cleaning dates over nine months old, should have their brakes cleaned and lubricated. Not only will the condition of the triple valve and brake cylinders fully warrant doing this work then, but it is improbable that such cars will again be so favorably located for many months, without causing delay and switching.

COMPARATIVE RAILWAY STATISTICS.*

INTRODUCTION.

As the service of the railways of a country is intimately related to the needs of the people of that country, the volume of traffic in large measure is determined at any given time by the aggregate of the population and its character. As the population may be dispersed over an extended region or concentrated in a small area, it is apparent that the extent of the railways and the characteristics of their service are related to the distribution of the population.

The serviceability of railways is to be viewed in the light of both supply and demand.

First, what is the proportion of miles of railway to the population and to the area over which that population is distributed; what are the facilities for moving traffic, the number and power of locomotives, the number and capacity of freight cars and of passenger cars?

Second, what use is made of the railways; what is the number of tons of freight they haul; what is the average number of ton miles handled per mile of line; what are the average ton miles in proportion to the population and in proportion to the area occupied by that population? What is the number of passengers they haul, what is the average number of passenger miles per mile of line, what are the passenger miles in proportion to the population and in proportion to the area occupied by that population?

A light is cast upon the economy of railway operation by the number of tons of freight hauled per freight train, and the number of passengers hauled per passenger train.

The pecuniary relation of the railways to the country they serve is revealed by their capitalization and their revenues.

The financial status of the railways is shown by the relation that their expenses for operation bear to their earnings, and by the relation of their net earnings to their capitalization.

As the population of a country increases its traffic increases, and therefore, other things equal, its railway facilities should increase. A series of comparisons indicating for certain intervals the increase in population, the increase in miles of railway and in facilities, the increase in freight traffic and in passenger traffic, may indicate roughly the growth in the industry and commerce of a country. The development of the financial status of the

railways will also be indicated if this comparison include the changes in capitalization per mile and in revenues and expenses per mile.

In this bulletin an attempt is made to present for the important commercial countries the fundamental statistics which reveal the railway status, and to demonstrate thereby the comparative serviceability, physical efficiency and financial condition of the railways of these countries.

Although their areas are approximately equal, the geographical, racial, and political characteristics of the United States and of Europe are so different that a comparison of the railway facilities and railway service of the total areas would not be enlightening. The less advanced sections of the United States are naturally more prosperous and are making greater progress than the backward regions of Europe. The statistics of the whole United States are not fairly comparable with those of any of the more advanced countries of Europe because of the great difference in area, in diffusion of population, and in general development. That portion of the United States comprised in what the Interstate Commerce Commission designates as Group II, which consists approximately of the states of New York, Pennsylvania, New Jersey, Delaware and Maryland, is comparable as to area, population, and industrial and commercial development with the United Kingdom, with France, and with Prussia-Hesse, wherein are the more important railways of Germany. Therefore in this bulletin Group II is compared with each of these countries respectively and a comparison is incidentally afforded of each of these countries with the other. The comparison is also made to include the entire United States in order to show the relation, in the respects referred to, of the country as a whole to Group II and to the different foreign countries.

The latest data available for the United Kingdom and for Prussia-Hesse relate to the year 1909. For France there are no more recent returns than for 1908. These are used in the text in comparison with the data of other countries for 1909 in the belief that the results thereby obtained do not vary more than a negligible degree from those that would be secured were the French statistics for 1909 available. Because of a change in the practice of the Interstate Commerce Commission the figures throughout the bulletin that apply to the United States as a whole and to Group II are based upon returns which for the years 1900 and 1905 include those of switching and terminal companies, but for the years 1908 and 1909 do not include those of switching and terminal companies.

It must be borne in mind that the industrial and commercial conditions of the United States and of these various countries of Europe widely differ, the channels of traffic are of different character, the volume of traffic is differently constituted and there is difference in the methods of keeping accounts. Therefore there can be no exact and absolute comparison. However, for such items as have been discussed, it is not thought that the variance from exact comparability impairs the essential accuracy of the broad and general deductions. Where close comparisons are impossible, the fact has been stated.

The statistics which appear in this bulletin were obtained from the annual reports on Statistics of Railways of the Interstate Commerce Commission, the annual compilations of the returns of the railways of the United Kingdom to the Board of Trade, the annual railway reports of the French Minister of Public Works, the voluminous abstracts of official railway returns published from time to time in the Archiv für Eisenbahnwesen, and the annual reports of the Prussian Minister of Public Works. The unit of weight is the short ton of 2,000 lbs. The compilations based upon these statistics were made by the statistical department of the Bureau of Railway Economics.

RAILWAY MILEAGE IN PROPORTION TO POPULATION AND TO AREA.

Population per square mile.	In 1909.	Compared with 1900.
Group II.....	181.8 persons	increased 21.4 per cent.
United Kingdom	370.8	increased 9.4 "
France	189.6	decreased 4.4 "
Prussia-Hesse	297.0	increased 14.8 "
United States	30.4	increased 18.9 "

The number of miles of line in a given region indicates how

*From Bulletin No. 24, Bureau Railway Economics.

extensively, and the number of miles of track how intensively, it is supplied with railways.

In the comparisons of "mile of track" only main tracks are used, siding and yard tracks being excluded.

Miles of line.	In 1909.	Compared with 1900.
Group II	23,887	increased 10.0 per cent.
United Kingdom	23,280	increased 6.5 "
France	24,931	increased 5.5 "
Prussia-Hesse	23,154	increased 21.2 "
United States	235,402	increased 22.3 "

Miles of track	In 1909.	Compared with 1900.
Group II	33,558	increased 15.4 per cent.
United Kingdom	39,622	increased 10.7 "
France	35,650	increased 5.9 "
Prussia-Hesse	33,133	increased 23.1 "
United States	259,975	increased 25.8 "

a First and second tracks.

Miles of line per 10,000 inhabitants.	In 1909.	Compared with 1900.
Group II	12.18	decreased 9.4 per cent.
United Kingdom	5.17	decreased 2.6 "
France	6.35	increased 4.4 "
Prussia-Hesse	5.67	increased 5.6 "
United States	26.05	increased 2.8 "

Miles of track per 10,000 inhabitants.	In 1909.	Compared with 1900.
Group II	17.11	decreased 4.9 per cent.
United Kingdom	8.80	increased 1.1 "
France	9.08	increased 5.0 "
Prussia-Hesse	8.11	increased 7.3 "
United States	28.77	increased 5.8 "

Miles of line per 100 square miles.	In 1909.	Compared with 1900.
Group II	22.14	increased 10.0 per cent.
United Kingdom	19.18	increased 6.5 "
France	12.04	increased 4.1 "
Prussia-Hesse	16.83	increased 21.2 "
United States	7.93	increased 22.3 "

Miles of track per 100 square miles.	In 1909.	Compared with 1900.
Group II	31.11	increased 15.4 per cent.
United Kingdom	32.65	increased 10.7 "
France	17.22	increased 4.6 "
Prussia-Hesse	24.08	increased 23.1 "
United States	8.75	increased 25.8 "

Per cent. of line having two or more tracks.	In 1909.	Compared with 1900.
Group II	31.2 per cent.	27.0 per cent.
United Kingdom	55.8 "	55.6 "
France	43.0 "	42.3 "
Prussia-Hesse	42.3 "	40.5 "
United States	8.9 "	6.3 "

That one country has a greater or less number of miles of line or of track than another in proportion to population or to area cannot alone be taken as a criterion of the relative adequacy of the supply of railway facilities. In the aggregate of such facilities, the number and power of locomotives and number and capacity of cars are factors of no less importance than miles of track. The demand for transportation, and the efficiency with which railway facilities are utilized in meeting that demand, must also be considered in determining the adequacy of transportation service. It should be noted that while a greater ratio of railway mileage to population or to area ordinarily indicates greater responsiveness to transportation demands, it may not inconceivably signify a redundant and excessive supply of mileage.

MOTIVE POWER AND EQUIPMENT.

Locomotives per 1,000 miles of line.	In 1909.	Compared with 1900.
Group II	561	increased 24.9 per cent.
United Kingdom	980	increased 1.0 "
France	480	increased 8.4 "
Prussia-Hesse	838	increased 24.3 "
United States	243	increased 24.6 "

Tractive power, not number of locomotives, furnishes adequate data for comparison of motive power facility. It is obvious that a locomotive that can draw one thousand tons ought not to count the same in a comparison with the locomotive that can draw but 500 tons. Unfortunately, however, the average tractive power per locomotive or the aggregate tractive power of all locomotives is not ascertainable except for the United States. As the average freight trainload of Group II is over twice as great as that of Prussia-Hesse, it is conservative to estimate that the 561 locomotives per 1,000 miles of line of Group II are capable of greater service than the 838 of Prussia-Hesse, and that the increase of 24.9 per cent. in the number of locomotives in Group II, and of 24.6 per cent. in the United States as a whole, represents an increase in motive power capacity considerably greater than the increase of 24.3 per cent. in the number of loco-

motives in Prussia-Hesse. The conservatism of this estimate is supported by the respective average capacity of freight cars and average number of tons per freight train, given in following paragraphs.

Cars of all kinds per 1,000 miles of line.	In 1909.	Compared with 1900.
Group II	22,388	increased 17.4 per cent.
United Kingdom	36,060	increased .9 "
France	14,704	increased 10.2 "
Prussia-Hesse	19,607	increased 19.1 "
United States	9,423	increased 25.1 "

In Group II, the increase in miles of line for 1909 over 1900 was 10 per cent. The ratio of increase in number of cars was three-fourths greater than the increase in miles of line.

In the United Kingdom the increase in miles of line was 6.5 per cent. The ratio of increase in the number of cars was one-seventh as great.

In France the miles of line increased 5.5 per cent. between 1900 and 1908. The ratio of increase in the number of cars was nearly twice as great.

In Prussia-Hesse the increase in miles of line between 1900 and 1909 was 21.2 per cent. The ratio of increase in the number of cars was nine-tenths as great.

In the United States as a whole the miles of line increased 22.3 per cent. and the number of cars in a greater ratio by one-tenth.

Passenger and freight cars per 1,000 miles of line in 1909.	Passenger cars.	Freight cars.
Group II	375	21,128
United Kingdom	2,270	32,020
France	1,159	*12,811
Prussia-Hesse	1,609	*17,530
United States	136	8,809

*Including cars in company's service.

The average seating capacity of passenger cars for Group II, for the United Kingdom, for France and for the United States is not ascertainable. The average for the passenger cars of the Pennsylvania Railroad in 1909 was 63, and for Prussia-Hesse 49. The average seating capacity for Group II is perhaps slightly lower than for the Pennsylvania Railroad, and that for the United States as a whole still lower. It is safe to estimate that the average seating capacity of the passenger cars of the United Kingdom and of France is lower than for the United States.

The average capacity of the freight cars of France in 1908 was 13 tons; of those of Prussia-Hesse in 1909, 15.5 tons, and of those of the United States, 35 tons. There are very few, if any, freight cars in England as large as those of the United States, the freight of that country being carried in "waggons" or "trucks" holding from 4 to 8 tons each. The measure of the total freight car capacity of the respective countries is afforded by the following table:

	Total number of freight cars.	Aggregate capacity of freight cars, tons.	Freight car capacity per 10,000 inhabitants.
United States	2,071,338	73,137,546	8,093
United Kingdom	745,348	(Data not available)	
France	*319,788	4,159,565	1,059
Prussia-Hesse	*405,900	6,280,260	1,537

*Including cars in company's service.

For each inhabitant the United States provides seven and one-half times as much freight car capacity as France, and nearly five and one-half times as much as Prussia-Hesse.

It is true, however, that the canals and rivers are a large factor in the conveyance of freight in both France and Germany than they are in the United States. Such waterways carry about one-seventh of the total interior freight of Germany and about one-ninth of that of France. Therefore, the aggregate capacity of the interior watercraft should be considered in arriving at the aggregate capacity of the freight vehicles of these countries. The capacity of the inland waterway craft in France in 1907 was 4,234,794 tons, which, added to the capacity of the freight cars, gives an aggregate capacity of 8,394,359 tons, or 2,138 tons per 10,000 inhabitants. The capacity of the inland waterway craft of Germany in 1907 was 6,900,000 tons. This added

to the freight car capacity of Prussia-Hesse, gives an aggregate freight capacity of 13,180,260 tons, or 3,226 tons per 10,000 inhabitants. Therefore, it will be perceived that the freight car capacity per inhabitant of the United States is over three and three-fourths times as great as the combined capacity per inhabitant of the freight cars and boats of France, and over two and one-half times as great as the combined capacity per inhabitant of the freight cars and boats of Prussia-Hesse. The aggregate freight car capacity of the United Kingdom is not ascertainable.

The development in power of locomotives and capacity of freight cars in the United States is due to the great volume of long haul traffic.

THE UTILIZATION OF THE RAILWAYS.

Up to this point comparisons of the serviceability of railways have been based upon their facilities. Further light is thrown upon that serviceability by the extent to which these facilities are utilized. If railways readily move all of the traffic offered to them the statistics of utilization measure both the extent of the service and the demand for that service. It is widely known that there have been periods in the United States during the past decade when the railways were badly congested, when their facilities were not equal to the immediate demand. However, there is no data to show that all of the traffic offered was not moved sooner or later, and there is no means of ascertaining with approximate accuracy whether such a condition has existed in other countries. Therefore, the following comparisons measure the extent or rather the degree of intensity to which the railways have been utilized, and in the absence of qualifying information may be accepted as a measure of the demand upon them.

The performance of a railway is measured by several units. One of these is

The Train Mile.—This is constituted of the run of one train for the distance of one mile. The total number of miles run by one train counts as the total train miles for that train. The aggregate of the train miles of all trains for a given period constitutes the total number of train miles for that period. If on a railway fifty miles long, ten trains were run each day for the entire length, there would be five hundred train miles a day, or for the three hundred working days of the year a total of one hundred and fifty thousand train miles. If on a railway one hundred miles long five trains were run each day for the entire length, there would be five hundred train miles a day, or for the three hundred working days of the year a total of one hundred and fifty thousand train miles. As the aggregate train miles in these two illustrations are the same for the railway fifty miles long and for the railway one hundred miles long, it is obvious that the intensity of train performance cannot be gauged simply by train miles. If the total train miles be divided by the number of miles of line, the quotient indicates the average number of train miles run over each mile of road. In the case of the fifty-mile road the train miles per mile of line would be three thousand; in the case of the road one hundred miles long the train miles per mile of line would be fifteen hundred. An equivalent expression for train miles per mile of line is train density.

Every railway carries more or less freight for its own use and therefore without pay, and in some countries both freight and passengers are occasionally carried free on governmental or other account. As such gratuitous service does not increase the monetary receipts, it is ordinarily omitted from such statements as appear in this bulletin. Therefore, the term "revenue train miles per mile of line" indicates the train density of trains that have added to the earnings.

The following tables show the density for all trains and for freight trains and passenger trains separately:

Revenue train miles per mile of line.	In 1909.	Compared with 1900.
Group II	9,715	(Data not available)
United Kingdom	18,009	decreased 2.1 per cent.
France	9,317	increased 2.2 "
Prussia-Hesse	12,164	increased 19.7 "
United States	4,726	increased 2.6 "

Freight train miles per mile of line.	In 1909.	Compared with 1900.
Group II	4,930	decreased 5.3 per cent.
United Kingdom	6,607	decreased 19.8 "
France	3,203	decreased 3.8 "
Prussia-Hesse	4,594	increased 2.7 "
United States	2,417	decreased 5.5 "

Passenger train miles per mile of line.	In 1909.	Compared with 1900.
Group II	4,642	increased 11.2 per cent.
United Kingdom	11,332	increased 12.6 "
France	5,129	increased 6.9 "
Prussia-Hesse	7,570	increased 64.5 "
United States	2,150	increased 14.3 "

No difference how long a train may be or how many passengers or tons of freight it may carry, it counts a train mile for every mile it runs. Therefore, a decrease in the number of train miles does not necessarily indicate a decrease in traffic. It may indicate that a greater quantity of traffic is being carried per train, and therefore that the performance from the standpoint of the railway is more economical. Of late years the railways in many countries have given especial attention to attaining heavier loads per train.

Therefore, from the viewpoint of economical operation, the serviceability of a railway or of the railways of a country is to be judged by the "revenue train miles per mile of line" taken in connection with certain other units. One of these is:

Ton miles per mile of line.	In 1909.	Compared with 1900.
Group II	2,451,841	increased 29.0 per cent.
France	565,158	increased 18.0 "
Prussia-Hesse	1,069,743	increased 20.3 "
United States	953,986	increased 29.7 "

In Group II the density of freight traffic was nearly four and one-half times as great as in France, and over twice as great as in Prussia-Hesse. The fact that in Group II the increase of 29 per cent. in the density of freight traffic was accompanied by a decrease of 5.3 per cent. in the number of freight train miles per mile of line, and that the increase in freight density in France of 18 per cent. was accompanied by a decrease of 3.8 per cent. in freight train miles per mile of line indicates a greater intensive use of motive power and equipment in each of these countries; that is, other things equal, a greater economy in operation.

Another measure of this intensive utilization of motive power and equipment is shown by the

Average tons per freight train.	In 1909.	Compared with 1900.
Group II	479	increased 34.9 per cent.
France	177	increased 22.9 "
Prussia-Hesse	233	increased 42.9 "
United States	363	increased 34.0 "

The success of the efforts to economize in operation through heavier loading is indicated by the great increase in the average train load secured in each country. It is significant that this average train load in Group II is nearly two and three-fourths times as great as in France and over twice as great as in Prussia-Hesse. The more powerful locomotives and larger freight cars of the United States are a great factor in this efficiency.

It will be perceived that in each country which shows a decrease in the freight train miles per mile of line the decrease has been accompanied by an increase in the average tons per freight train and the average ton miles per mile of line; that is, in each of these countries a greater freight traffic has been moved with fewer freight trains.

An index to the volume of commerce in proportion to population is afforded by the

Average ton miles per inhabitant.	In 1909.	Compared with 1900.
Group II	2,950	increased 15.5 per cent.
France	359	increased 22.9 "
Prussia-Hesse	606	increased 24.7 "
United States	2,421	increased 30.0 "

For each inhabitant of Group II over eight times as many tons of freight are moved by rail as for each inhabitant of France and nearly five times as many as for each inhabitant of Prussia-Hesse.

The railways of the United States as a whole carry for each inhabitant nearly seven times as many ton miles as are carried for each inhabitant of France by its railways, and four times

as many as are carried for each inhabitant of Prussia-Hesse. This is all the more remarkable when it is reflected that the density of population in the United States is less than one-sixth of that in France and only about one-tenth of that in Prussia-Hesse.

A comparison of the passenger traffic may be made in the same manner as that of the freight; that is, with the use of analogous units.

Passenger miles per mile of line.	In 1909.	Compared with 1900.
Group II	290,023	increased 42.9 per cent.
France	398,984	increased 8.1 "
Prussia-Hesse	675,023	(Data not available)
United States	127,299	increased 52.8 per cent.

It will be perceived that in Group II and in the United States as a whole the increase in the passenger miles per mile of line was greater than the increase in the passenger train miles per mile of line. In France the increase in passenger density was slightly greater than the increase in passenger train density.

An explanation of the lower density of passenger traffic in Group II than in France or Prussia-Hesse is found in the fact that in proportion to population Group II has twice as many miles of line as France, and considerably more than twice as many miles of line as Prussia-Hesse. The significance of this is made manifest by a comparison of the

Passenger miles per inhabitant.	In 1909.	Compared with 1900.
Group II	347.5	increased 27.4 per cent.
France	253.7	increased 13.0 "
Prussia-Hesse	366.7	increased 49.8 "
United States	322.1	increased 52.7 "

The ratio is greater for Group II and for the United States than for France, and is only fractionally less for Group II than for Prussia-Hesse. In consideration of the greater ratio of passenger miles per inhabitant in Prussia-Hesse, there must not be overlooked the fact that the component parts of the great army of Germany are in frequent movement from one garrison to another and to and from the often recurring reviews and maneuvers. Moreover, the passenger traffic of the countries of Europe is constituted in no small measure by tourists from other countries, particularly from the United States, the passenger miles of this tourist traffic swelling the aggregate which is credited to the inhabitants of the respective countries.

That the number of passengers carried per train increases more rapidly in the United States than in either France or Prussia-Hesse is shown by a tabulation of the

Average passengers per train.	In 1909.	Compared with 1900.
Group II	60	increased 27.7 per cent.
France	65	increased 1.6 "
Prussia-Hesse	85	increased 6.3 "
United States	54	increased 31.7 "

The inability to take account of the ton mile and the passenger mile traffic of the United Kingdom is regretted. Such statistics are not compiled by any of the railways of Great Britain, except that the North Eastern Railway of England compiles freight statistics.

CAPITALIZATION, REVENUES AND EXPENSES.

The capitalization of the railways of the United States is the net capitalization per mile reported by the Interstate Commerce Commission. In arriving at this amount, the stocks and securities of one railway corporation that are held by another are excluded, because the stocks and securities so held are ordinarily covered by the capital issues of the holding company. This net capitalization is not ascertainable for Group II. There is probably little or no such duplication in the capital issues of the railways of foreign countries.

Capitalization per mile of line.	In 1909.	Compared with 1900.
United States	\$59,259	(Data not available)
United Kingdom	274,766	increased 4.9 per cent.
France	141,301	increased 5.8 "
Prussia-Hesse	110,727	increased 12.9 "

It is noteworthy that the capitalization per mile of the railways of the United States is but little more than half that of the railways of Prussia-Hesse, considerably less than half that of the railways of France, and less than one-fourth that of the railways of the United Kingdom. The capitalization of the

railways of England and Wales alone for 1909 was \$328,761 per mile, over five times as great as that of the United States. In view of these figures it becomes clear, as stated by General Henry S. Haines, that the burden of proof that the railway system of the United States is not overcapitalized does not rest upon the railway corporations.

Operating revenues per mile of line.	In 1909.	Compared with 1900.
Group II	\$22,021	increased 33.3 per cent.
United Kingdom	23,135	increased 5.1 "
France	13,406	increased 8.4 "
Prussia-Hesse	21,056	increased 20.7 "
United States	10,356	increased 34.1 "

These operating revenues for the different countries are not exactly comparable because they are not in all respects similarly constituted. In Prussia-Hesse, for example, certain receipts are included in revenues from operation that in the United States would be classified as "other income." These amount, however, to less than 3 per cent. of the total. However, the relative significance of these revenues cannot be fully appreciated without taking into account the volume of traffic. This factor is included in the comment upon the immediately succeeding tables.

Freight revenue per mile of line.	In 1909.	Compared with 1900.
Group II	\$15,693	increased 32.4 per cent.
United Kingdom	12,433	increased 4.4 "
France	7,196	increased 8.2 "
Prussia-Hesse	13,580	increased 17.1 "
United States	7,184	increased 31.4 "

For Group II the freight revenues per mile of line are about 25 per cent. greater than for the United Kingdom.

For Group II the freight revenues per mile of line are over twice as great as for France. However, as already noted, the ton miles per mile of line are nearly four and one-half times as great, and the ton miles in proportion to population are over eight times as great.

For Group II the freight revenues per mile of line are one-sixth greater than for Prussia-Hesse. However, the ton miles per mile of line are over twice as great, and the ton miles in proportion to population nearly five times as great.

These comparisons would indicate that the average receipts per ton mile are lower in the United States than in either France or Prussia-Hesse, and this we find to be the case. For Group II the average receipts per ton per mile are .65 cents; that is, six and five-tenths mills; for France they are 1.21 cents, and for Prussia-Hesse 1.24 cents. The average receipts per ton mile for the one railway of England that compiles such statistics are 2.30 cents, but this includes collection and delivery of certain high-class traffic. Because of the varying transportation conditions in the countries compared, the average receipts per ton mile must not be accepted as an absolute proof of the relative height of freight rates in Europe and the United States.

A similar analysis of the passenger traffic and the passenger revenues shows a different condition.

Passenger revenues per mile of line.	In 1909.	Compared with 1900.
Group II	\$4,884	increased 34.2 per cent.
United Kingdom	10,704	increased 5.9 "
France	4,418	increased 4.1 "
Prussia-Hesse	5,741	increased 24.3 "
United States	2,395	increased 42.5 "

For Group II the passenger revenues per mile of line are less than half of those of the United Kingdom. It should be noted, however, that the English returns of passenger revenues cover all passenger train traffic, and include receipts from baggage, mail, and the like.

For Group II the passenger revenues are about 10 per cent. greater per mile of line than for France. The passenger miles per mile of line are over one-third greater in France, while the passenger miles per inhabitant are only about two-thirds of those of Group II.

For Group II the passenger revenues per mile of line are about six-sevenths of those of Prussia-Hesse. The passenger miles per mile of line are less than one-half those of Prussia-Hesse and the passenger miles are about 5 per cent. less per inhabitant.

The average receipts per passenger mile in Group II are 1.7

cents; in France, 1.11 cents, and in Prussia-Hesse, .94 cents; in the United States as a whole, 1.93 cents.

Operating expenses per mile of line.	In 1909.	Compared with 1900.
Group II	\$14,674	increased 38.0 per cent.
United Kingdom	14,833	increased 7.9 "
France	7,765	increased 15.6 "
Prussia-Hesse	14,527	increased 40.1 "
United States	6,851	increased 37.2 "

These operating expenses for the different countries are not exactly comparable because they are not in all respects similarly constituted. For example, in Prussia-Hesse rentals and certain other items are included in operating expenses that in the United States are charged to other accounts.

Although in the United Kingdom there were nearly twice as many train miles per mile of line as in Group II, the operating expenses per mile of line for Group II are only fractionally less.

Although the train miles per mile of line in France are virtually the same as in Group II, the operating expenses for Group II per mile of line are nearly twice as great.

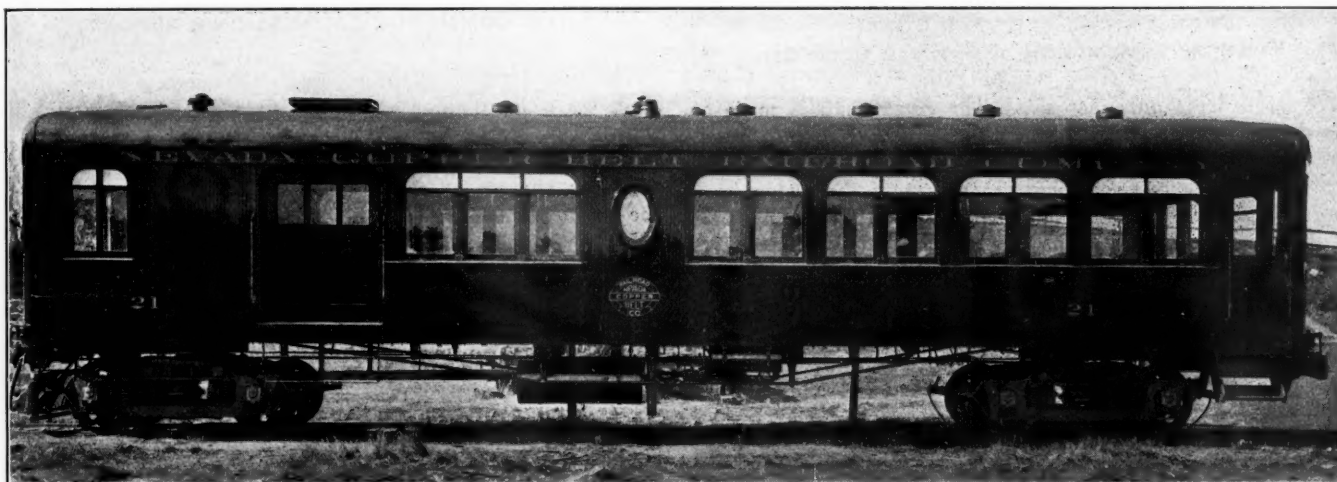
The operating expenses per mile of line for Group II are substantially the same as for Prussia-Hesse, although the train miles per mile of line are a fifth less.

Net operating revenue per mile of line.	In 1909.	Compared with 1900.
Group II	\$7,347	increased 25.0 per cent.
United Kingdom	8,302	increased .4 "
France	5,641	decreased .1 "
Prussia-Hesse	6,529	decreased 7.6 "
United States	3,505	increased 28.4 "

GASOLENE MOTOR CAR.

The Nevada Copper Belt Railway has recently received a type M-6 combination railway motor car from the Hall-Scott Motor Car Company of San Francisco, Cal. It is 55 ft. over the bumpers and will accommodate 70 passengers. The seats are wide enough to comfortably seat three passengers and still leave room for an aisle 18½ in. wide, the car being 10 ft. 3 in. in width. The car was given a severe test while being run from the works of the company at West Berkeley, Cal., to Mason, Nev., a distance of 337 miles. It traveled over the lines of the Southern Pacific, and had to make a long climb of 69 miles east of Sacramento, Cal., with a maximum grade of 3 per cent. and a minimum grade of 2 per cent. It did this in a satisfactory manner and would easily pick up on the grades to a speed of 15 to 20 miles an hour on the third speed. On the descent, however, the officials of the Southern Pacific not wishing to risk the car descending alone, ordered a freight engine to pilot it down to Truckee. From Truckee to Sparks, Nev., the run was made in fast time, the car attaining a speed as high as 55 miles per hour.

The gasolene consumption between Sacramento, Cal., and Sparks, Nev., over the mountain, was excessive, as the car had to run at a reduced speed and made frequent stops on account of meeting trains. One hundred gallons of gasolene were used from Oakland, Cal., to Sparks, which gave a rate of consumption of 1 gal. to every 2.3 miles. On the run from Oakland to



Gasolene Motor Car; Nevada Copper Belt.

As the operating revenues and the operating expenses are not exactly comparable, it follows that the net operating revenues cannot be closely compared. The results in one country for one year are of course comparable with the results in the same country for another year.

In Group II the increase has been 25.0 per cent., while the ton miles per mile of line have increased 29 per cent. and the passenger miles per mile of line 42.9 per cent.

In France there has been a decrease of one-tenth of 1 per cent. in net revenue per mile, while the ton miles per mile of line have increased 18.0 per cent., and the passenger miles per mile of line 8.1 per cent.

In Prussia-Hesse there has been a decrease of 7.6 per cent. in net revenue per mile, while the ton miles have increased 20.3 per cent.

The revenue of the Argentine railways for 1910 was \$304,697,548, but that for 1912 is estimated at \$331,854,630. The expenditure for 1911 was estimated at \$425,395,261, or \$120,697,712 more than the estimated revenue. The expenditure for 1912 has been estimated at \$379,238,540. The noticeable feature is that no new taxes are imposed and that the expenditure for public works has been reduced.

Sacramento, and from Sparks to Mason, Nev., however, the car averaged a little better than 4 miles to a gallon. The car was taken almost directly from the shops, having had very little trying out and the only accident which occurred during the trip was due to one of the employees carelessly allowing the stem of an oil can to be caught in the magneto driving gears. This necessitated the motor being run under the other ignition system.

The interior finish of the main passenger and smoking compartments is of Philippine mahogany; the ceilings are of sheet steel. The car is vestibuled at the rear end and is provided with two side doors. The engine is placed in the front part of the car, the baggage room being behind it. The passenger compartment is in the rear. The floor has a bottom course of fir and a top course of narrow maple. The car is lighted by storage batteries, which are charged by a generator direct connected to the gasolene engine. The air brake equipment consists of the Westinghouse automatic and straight air brakes of the A. M. M. type. The air compressor is driven directly from the engine and has two 4 in. x 4 in. cylinders; the pressure is maintained at 90 lbs.

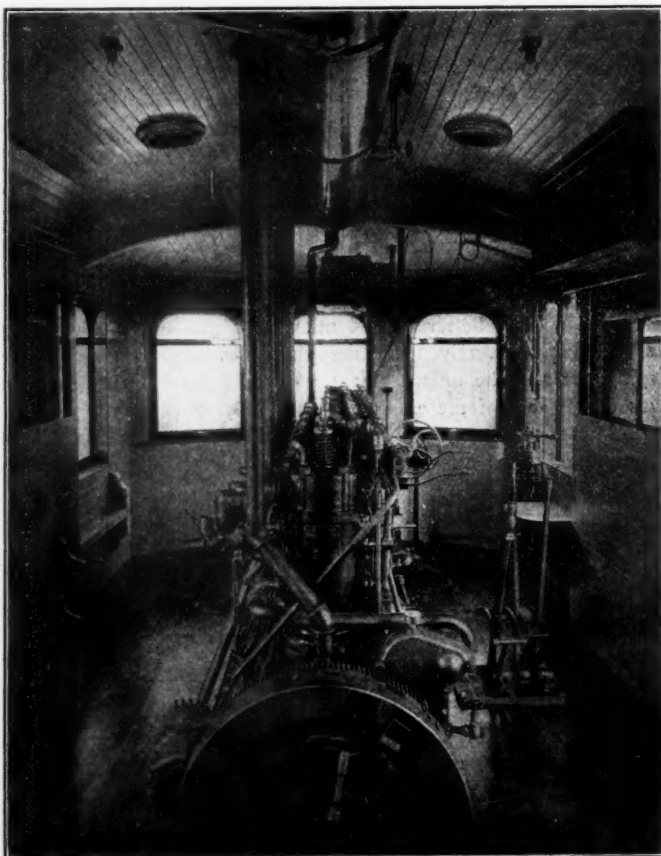
The framing of the car is a combination of steel and wood. The trucks have a wheel base of 6 ft. 6 in. The axles are 5½ in. in diameter and have 4¼ in. x 8 in. journals, and 33-in. cast iron

chilled plate wheels. A 6-cylinder gasolene engine is used, which develops 150 h. p. at 600 r. p. m. It is placed above the floor, so that all its parts are accessible to the operator. It is of the four-cycle, water-cooled type, having its valves driven by individual rocker arms. The crank case is of the enclosed type and has



Passenger Compartment of Gasolene Motor Car.

three large doors on either side. The crank shaft is made of Lloyd stamped steel, the bearings being $\frac{3}{8}$ in. in diameter. It is forged in one piece and machined to size. The connecting rods are of the same material, being connected to the piston by a hardened pin and bronze bushing. The oiling system is positive, the oil being pumped from the bottom of the crank case through



Engine Room of Gasolene Motor Car.

a sight feed to all the main bearings. The excess oil runs back through a strainer to the crank case.

The ignition system consists of an Atwater Kent unispark connected to dry batteries, and also a Bosch magneto with connections to separate sets of Bosch plugs. The cooling water is circulated by a large centrifugal pump located in the engine room, which draws the water from a storage tank of large capacity. The radiators are carried underneath the car framing. The generator that charges the storage batteries is also used for starting the engine. The clutch is self-contained in the flywheel and is absolutely free when released, thus allowing the car to be started easily. The shaft that connects the motor to the rear truck is made in two sections; the first section is held in babbitted boxes underneath the framing, and the second is provided with a large toggle and slip joint, which allows the truck to move when rounding curves.

The transmission and driving mechanism is placed on the rear axle of the rear truck. The transmission provides 4 speeds in either direction without reversing the motor. The car is reversed by operating a single lever in the engine room, the same as on a locomotive. The gear changes are made with two levers arranged so that it is impossible to move one without having the other in the neutral position, which prevents any danger of meshing two gears at the same time. The transmission and the big bevel gears on the rear axle are machined from hand-forged steel and are hardened in bone dust and ground to size.

THE COMMERCE COMMISSION'S REPORT.

The annual report of the Interstate Commerce Commission to Congress calls attention to the greatly increased labor and authority devolving upon the commission from the amendment of the interstate commerce law of June 18, 1910, and describes the measures adopted by the commission to simplify and expedite the discharge of its duties. Decisions have been rendered in 507 formal proceedings and 145 have been dismissed on stipulation of both parties or on motion of the complainant, a total of 652 cases removed from the docket. During the year 881 formal complaints have been filed and 12 proceedings of inquiry instituted by the commission on its own motion. But the commission says that evidence in many cases pending has been taken and that the work of the commission is well in hand.

On the commission's special docket for cases in which there is no dispute as to the facts there have been filed 5,653 cases, an increase of 551 over the preceding year. Orders have been issued in 3,875 cases on this docket, an increase of 367; and reparation awarded in the total sum of \$329,388, a decrease of \$75,588 as compared with 1910. In addition there have been dismissed or otherwise closed 739 claims, a decrease of 624 under the preceding year.

The report discusses the application of the Mann-Elkins act to telegraph and telephone companies and makes the point that, effective control over rates under the act depends chiefly upon the legal publication of rates and terms, the failure of the act specifically to require these companies to post their rates hampers the commission in any effort to regulate them. The commission says that changes in the act are necessary in order to make it clearly applicable to telephone, telegraph and cable companies.

The commission expresses the opinion that no uniform freight classification can be permanently adopted without the force of law to require its adoption and maintenance. The commission recommends the passage of a law requiring the carriers to provide and put in force a uniform classification within a period of five years.

Of criminal prosecutions the commission says:

"Since December 1, 1910, 62 indictments for criminal violations of the act to regulate the commerce have been returned, many of which are against two or more defendants jointly. Of these, 29 are against carriers or carriers' agents, 26 against ship-

pers or passengers, and 7 against carriers and shippers jointly.

"During the past year 42 prosecutions have been concluded, in 16 of which the defendants pleaded guilty; in 13, juries rendered a verdict of guilty; in 3, juries rendered a verdict of not guilty; 6 cases were nol prossed; 2 were dismissed on motion of defendant, and 2 on demurrer. The penalties assessed ranged in amounts from \$25 to \$40,000, the aggregate being \$214,225."

Previous to February 17, 1911, the day on which the fourth section of the act of 1910 became practically effective, 5,030 applications for relief from the effect of the long and short haul clause were filed and since that date 693 more have been added. Many of these applications the commission says are exceedingly voluminous and intricate, involving thousands of rates and many different situations. The only fourth section order "directed to a particular situation of much general significance" was that made on application of the transcontinental railways for leave to make higher rates on westbound traffic to intermediate territory than to Pacific coast terminals. Most of the applications are yet to be passed on, but cases have already been submitted or are in process of investigation which when decided will determine general principles by which the commission is to be guided. The subsequent disposal of the other applications will go rapidly. In defense of its decision in the Inter-Mountain cases, which has been reversed recently by the commerce court and is pending on appeal to the Supreme Court, the commission says in part:

"To justify their rates from coast to coast, the railways advance water competition, and to justify the same rates from interior points to Pacific coast points, they rely on market competition; under which they give lower rates from all the interior cities two-thirds of the way across the continent to the same coast cities than to inter-mountain points. This is the kind of discrimination the commission has attempted to minimize. . . .

"We have the frank admission of the railway managers that they have subsidized or bought some of the steamship lines, and terrorized others until they can make the boast that the effect of the sea has been 'neutralized.'

"A railway policy of rate-making must certainly be subject to limitations of the law, or else there is no law. To say that there is a long-and-short-haul section under which a carrier may not charge more for the shorter than for the longer haul, but that the railways may, to any extent they please, carry out a policy of blanketing the country for the benefit of the farther points and not the nearer points, is to say that a railway may, without restraint, effect a ruinous discrimination and give no justification save its own determination or whim. There can be no regulation of rates as to discrimination or preference under such an interpretation of the law.

"The commerce court intimates that the mistake of the commission is in having attempted to fix a relation of rates instead of establishing reasonable rates; but, as we have already pointed out, there is no way in which the discrimination found to exist in these tariffs can be prevented except by fixing a differential, since we have no power to establish an absolute rate or fix a minimum charge below which the carrier is not free to go.

"We feel strongly that water competition, even when the widest reasonable latitude is given to the effect of market competition, cannot by any possibility justify a higher rate from Omaha to Reno than from Omaha to San Francisco; from St. Paul to Spokane than from St. Paul to Seattle.

"Upon the other hand, it should be noted that the opening of the Panama Canal may so add to the intensity of this water competition as to call for some modification of the conclusion now reached.

"The fourth section prohibits, in general terms, the charging of more for the short than for the long haul, but provides that the commission may, upon application to it, relieve carriers from the obligation of this section by permitting the higher rate at the intermediate point. If this language were to be taken at its face value, this body would be invested with the arbitrary power

of granting such relief in one case and denying it in another, although the two cases were practically identical. We have held, however, that it was not the intent of Congress to attempt to confer such arbitrary jurisdiction upon this commission, but that we must act, in passing upon these fourth-section applications, in view of the other section and provisions of the act to regulate commerce. It is our duty to inquire with respect to each application whether, if the carrier is allowed to make the higher charge at the intermediate point, it will result in rates which are unreasonable or unduly discriminatory.

"The section also authorizes the commission to prescribe the extent to which the carrier may be relieved from the rule of the section. We understand this to mean that if the commission reaches the conclusion that some higher charge might properly be imposed at the intermediate point, but that the present discrimination is too great, then it may fix the extent to which the rate at the short-distance point may exceed that at the long-distance point.

"In the opinion of the commerce court, if we find competitive conditions at the more distant point which do not obtain at the intermediate point we must grant the relief, and can only inquire whether the intermediate rate is reasonable. In the opinion of the commission we must go further, and must inquire, not only whether competitive conditions do exist at the more distant point, but also whether those conditions justify the discrimination against the intermediate point evidenced by the rates in force. If we find that those competitive conditions do exist, but do not justify a discrimination of the degree now in force, then it is our duty to prescribe the extent to which the discrimination may go, if at all.

"The commerce court refers to certain decisions of the Supreme Court of the United States, made under the act as it existed previous to the amendment of 1906, when the commission had no authority to prescribe a reasonable rate for the future, nor to determine the undueness of a particular discrimination, in support of its conclusion. It deduces from those decisions, apparently, the rule that where competition exists at the long-distance point the rate to that point can not be made the measure of a rate to the intermediate point.

"Manifestly, a compelled rate, to the extent that it is not voluntary, cannot with justice be made the measure of a reasonable rate.

"The commission desires to make plain at the outset that this principle has been fully recognized by it in passing upon applications under the amended section. Wherever the rate to the long-distance point is fixed and beyond the control of the applicant, we do not require the applicant to observe any relation between the long-distance and the intermediate rate; we have simply inquired whether the intermediate rate is reasonable.

"It sometimes happens, for example, that a state commission names a rate between two points within a state. A circuitous interstate line desires to meet this rate. Under these circumstances the commission recognizes the state rate as fixed, and if it finds that the other route is circuitous and that its intermediate rates are reasonable it permits the long line to meet the state rate without reference to its intermediate rates. If the state commission were to advance or to reduce its rate the interstate line might vary its own tariff between those points without any change whatever at the intermediate point.

"Passenger tariffs, are generally constructed upon a mileage basis. We have uniformly recognized the short line as the rate-making factor and have permitted the circuitous line to meet the rate of the short line without any reference to its intermediate points so long as the fare to those points was properly constructed.

"So, again, where a freight rate upon a particular commodity is made by a short interstate line we have permitted its circuitous competitor to meet the short-line rate without reference to its intermediate territory, provided it was clear that the short line did make the rate, that the long line simply met that rate, and

that its intermediate rates were apparently upon a proper basis. If the short line were in the future to reduce that rate the long line is allowed by the terms of our orders to meet that reduction without a corresponding reduction of intermediate territory.

"We refer to these illustrations for the purpose of making it perfectly plain that this commission has recognized from the first the injustice of making a rate over which the carrier has no control whatever the measure of its other rates, whether they be intermediate rates or whether they be upon other parts of its system. We have established a relation between these Pacific Coast terminal rates, and corresponding rates to interior territory because neither the terminal rate nor the interior rate is fixed by causes over which the carrier has no control, but both are, within certain limits, voluntary."

The commission expresses its dissatisfaction with the commerce court in part as follows:

"Out of 27 cases passed on by the commerce court, preliminary restraining orders or final decrees have been issued in favor of the railways in all but seven cases, and of these only three are of any magnitude. In saying that the court has ruled in favor of the railways, we do not mean that the ruling has been always adverse to the commission, but it has been adverse to the shippers' contention. For instance, the court decided in favor of the commission in the two Cincinnati rate cases. These were proceedings in which the shippers of Cincinnati sought to have the commission ordered to reopen a case and fix a lower scale of rates to Chattanooga than had been ordered, on the ground that the rates fixed by the commission were unreasonably high and had been based upon considerations which the commission should not have regarded, namely, competition from the East and the West. In these cases the court held that it had no right to review the findings of the commission.

"Again, in the Procter & Gamble case, involving the right of a carrier to impose demurrage on a private car standing on a private track, the commission was sustained, its view being that for which the railway also contended.

"In but three cases of any consequence where the commission and the shippers have been opposed to the railways, have the orders of the commission been sustained even temporarily by the refusal to grant a temporary restraining order. These cases were the Meeker case, the Salt Lake case and the Omaha lumber case."

The commission repeats the recommendations it made in its last previous report that government regulation of security issues be provided by law and that a valuation of the property of the railways be authorized.

General summary of monthly reports of revenues and expenses of steam roads:

	Year ended June 30.		Av. per mile of road operated.	
	1911.	1910.	1911.	1910.
Av. No. miles operated.....	243,229	239,483	—	—
Operating revenues:				
Freight	\$1,929,335,456	\$1,934,771,579	\$7,932	\$8,078
Passenger	658,772,785	631,340,776	2,708	2,636
Other transportation	202,762,574	193,623,216	833	808
Non-transportation	27,909,581	26,944,043	114	112
Total	2,818,780,398	2,786,679,616	11,588	11,636
Operating expenses:				
Maintenance way & structure..	369,581,610	373,386,571	1,519	1,559
Maintenance equipment	431,892,653	417,212,906	1,775	1,742
Traffic	59,344,440	56,198,298	243	234
Transportation	1,000,603,053	931,062,770	4,112	3,887
General	74,046,630	68,767,531	304	287
Total, includ'g unclassified	1,935,511,581	1,846,702,779	7,957	7,711
Net operating revenue:				
Rail operations	883,268,817	939,976,836	3,631	3,925
Outside operations	2,072,538	2,655,347	8	11
Total net operating revenue...	885,341,355	942,632,183	3,639	3,936
Taxes	109,108,490	104,821,374	448	437
Operating income	776,232,865	837,810,808	3,191	3,498

The estimates for government railway construction in Chile during 1912 include \$5,321,700, for the completion of 19 branch railways in the different parts of the country, with \$912,500 for initial work on 12 new feeders on which it is proposed to begin work during the year.

TRAIN ACCIDENTS IN NOVEMBER.¹

Following is a list of the most notable train accidents that occurred on the railways of the United States in the month of November, 1911. This record is based on accounts published in local daily newspapers, except in the case of accidents of such magnitude that it seems proper to write to the railway manager for details or for confirmation.

Collisions.					
Date.	Road.	Place.	Kind of Accident.	Kind of Train.	Kil'd. Inj'd.
9.	Louisv. & N.....	Brownsville.	rc.	P. & F.	2 0
9.	Western & A.....	Dalton, Ga.	bc.	F. & F.	1 2
11.	Texas & Pac.....	Rosa.	rc.	P. & F.	1 0
*13.	N. Y., C. & St. L....	Ashtabula.	rc.	F. & F.	2 1
15.	Ann Arbor	Cadillac.	bc.	P. & F.	0 12
*16.	Balt. & O.....	Breese.	xc.	P. & F.	0 3
*16.	Nor. Pac.	Pipestone.	rc.	F. & F.	6 0
19.	Great Nor.	Rugby.	bc.	P. & F.	2 5
20.	Ills. Cent.	Logan.	bc.	P. & F.	2 15
21.	N. Y. Cent.....	Syracuse.	xc.	P. & F.	2 7
23.	Tex. & Pac.....	Shreveport.	xc.	P. & F.	0 9
24.	Southern	Scotland, Ga.	bc.	P. & F.	3 5
27.	Boston & A.....	Chester.	rc.	F. & F.	1 0
30.	Erie	Marion.	xc.	P. & F.	3 1
	C., C., C & St. L. }				

Derailments.					
Date.	Road.	Place.	Cause of derailmt.	Kind of Train.	Kil'd. Inj'd.
†2.	Southern	Atlanta.	b. rail.	P.	2 9
2.	Seaboard A. L.....	Merry Oaks.	unx.	P.	0 18
3.	Illinois Cent.	Clinton.	d. bridge.	F.	3 1
7.	St. Louis, I. M. & S..	Arcadia.	b. rail.	P.	1 2
9.	St. Louis & S. F....	Fort Scott.	boiler.	P.	2 0
13.	Southern	Greensboro.	unx.	P.	1 5
13.	Louisv. & N.....	Murphy.	b. rail.	P.	0 7
17.	Penn.	Monmouth J.	.....	P.	2 0
21.	Midland Val.	Bixby.	unx.	P.	0 11
22.	N. Y. Cent.....	Rhinebeck.	acc. obst.	F.	0 2
22.	Chi., R. I. & Tex....	Dallas.	unx.	P.	1 3
30.	Mo. Pacific	Carthage.	b. rail.	P.	0 7

The collision at Pipestone, Mont., on the 16th was between a train of empty passenger cars and a work train; and the six persons killed were a roadmaster, a section foreman, the conductor of the work train and three laborers riding in the caboose of the work train. The wreck took fire and four of the bodies of the victims were cremated. The collision is reported to have been due to a misunderstanding of flagging instructions between the work train conductor and his brakeman.

The derailment at Clinton, Ill., on the 3rd occurred on a pile trestle bridge which was temporarily supported on false work; and the engine and two freight cars fell to the ravine below. The engineer, one brakeman and a student fireman were killed. The trestle was being replaced by steel girders, resting on concrete piers, and the engine, moving at a speed of about four miles an hour, had just passed off the steel structure and had moved only about 30 ft. on the trestle.

The train derailed at Monmouth Junction, N. J., on the 17th was an express bound from Philadelphia to New York, and the derailment was due to excessive speed through a No. 8 crossover. The engineer and fireman were fatally scalded, but no other person was seriously injured. The locomotive was overturned, but the cars (all of them of steel) remained upright, and it is said that no windows were broken, though the train was probably running at 45 miles an hour, when it entered the crossover. The engineer was a runner of 29 years' experience, and had been running passenger trains on this division 18 years. He had passed a distant and a home signal indicating that he was to take the crossover.

Electric Accidents.—Of the 13 accidents to electric cars reported in the newspapers as occurring in the United States in

¹ Abbreviations and marks used in Accident List:

rc, Rear collision—bc, Butting collision—xc, Other collisions—b, Broken—d, Defective—unf, Unforeseen obstruction—unx, Unexplained—derail, Open derailing switch—ms, Misplaced switch—acc, obst., Accidental obstruction—malice, Malicious obstruction of tracks, etc.—boiler, Explosion of locomotive on road—fire, Cars burned while running—P, or Pass., Passenger train—F, or Ft., Freight train (including empty engines, work trains, etc.)—Asterisk, Wreck wholly or partly destroyed by fire—Dagger, One or more passengers killed.

the month of November, two are reported as having resulted fatally; a runaway on a steep grade at Cincinnati, on the second, in which one passenger was killed and 20 were injured; and a collision at Winston-Salem, N. C., on the 13th, in which one passenger was killed and 14 were injured.

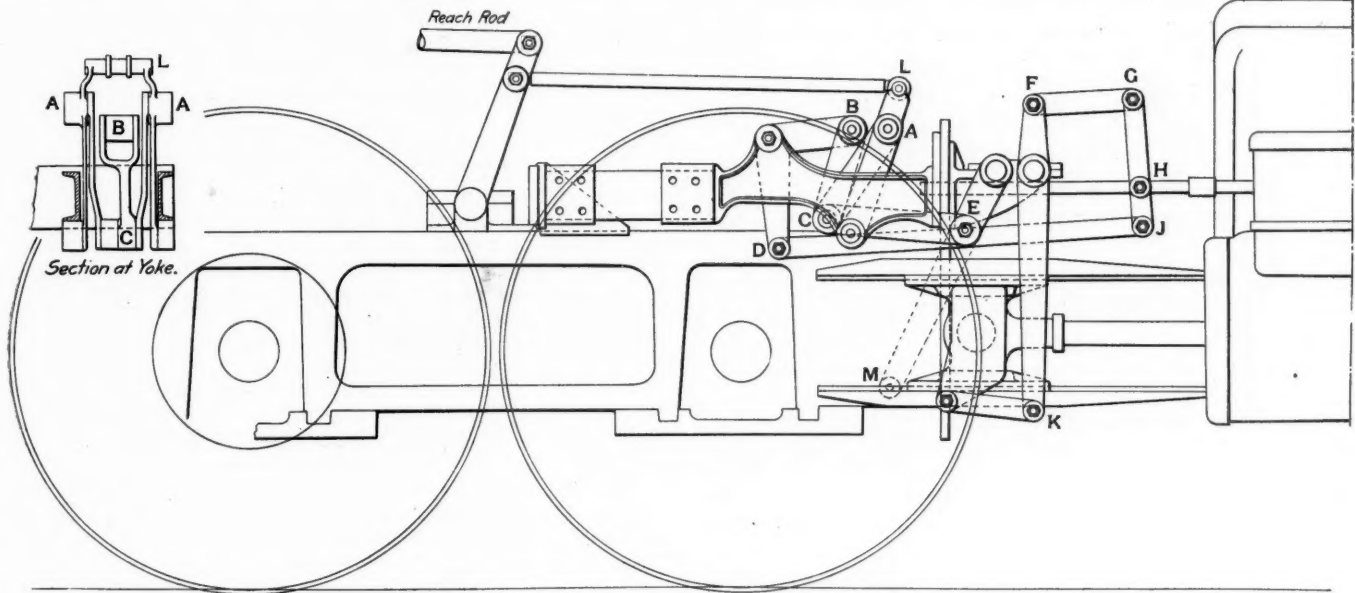
PILLIOD LOCOMOTIVE VALVE GEAR.

A new type of valve gear, known as style B, has been recently put on the market by the Pilliod Brothers Company, Toledo, Ohio, and is intended to replace all other styles of their gear. The general arrangement is shown in the accompanying illustration. The valve motion is obtained wholly from the crossheads. The combination lever is connected to the crosshead by a link and transmits the motion to the auxiliary combination lever by means of the link connecting points F and G. This motion controls the lap and the lead of the valve, the auxiliary combination lever being connected to the valve stem at H, as shown. The combination lever swings on a cross-shaft which extends through to the other side of the engine, operating the combination arm on that side. The combination arm in turn operates the motion

one load. It soon developed that the many different kinds of loads made at times very light loading for the engines and at other times very heavy loading. To eliminate this difficulty this table was prepared, in which the different classes of loading were equated. For instance, if the rating of an engine was 40 cars, it would mean 40 cars of coal or coke. The equivalent in carloads of cattle would be 48, in double deck carloads of hogs 45, in single deck carloads of hogs 60, in double deck carloads of sheep 52, in single deck carloads of sheep 67, in eastbound merchandise 50 cars, in westbound merchandise, or what was then called "line" freight, 63 cars, and in empties 80 cars.

In making up the trains the yardmasters used this table to make a full trainload. If, for instance, the rating over the eastern end of the line was 20 loads, and a train had five cars of coal and 25 cars of westbound merchandise, it would be considered as equivalent to a trainload. An eastbound movement of 10 cars of grain and 25 cars of eastbound merchandise would make 30 loads, and so on through the table. The estimated weight of the car and its contents is shown at the top of the column, empty cars in those days averaging 18,500 lbs. each.

This is one of the earliest tonnage rating sheets made, and



New Type of Pilliod Locomotive Valve Gear.

rod extending from point E to point C. This oscillates the radius yoke about point A, which raises and lowers the radius bar. This bar is connected at point B to the bell crank lever, which swings about its fixed center. The radius rod connects the points D, on the bell crank lever, to the point J at the bottom of the auxiliary combination lever. This rod gives the accelerated movement to the valve. Point L is connected to the reverse lever by the reach rod and its movement will cause the point C to move in various planes, which will control the cut-off of the valve. All parts of this valve gear, including the frames, and with the exception of the combination lever are standard for any type or class of engine, whether inside or outside admission. The men cannot make any changes in the gear, as there are no rods to lengthen or shorten; it can be applied in 48 hrs. without any modification of the engine, and requires only the ordinary engine house equipment for installation.

AN EARLY TONNAGE RATING SHEET.

The accompanying tonnage rating table was published in July, 1881, on what was then the Pittsburgh, Cincinnati & St. Louis Railway, running between Pittsburgh and Columbus, Ohio, now a part of the Pennsylvania Lines Southwest system. Previous to this time the engines were rated over the different grades on the basis of loaded cars, two empties being considered equal to

it would be interesting to learn if any one has any record approximating the tonnage rating of an earlier date. It is interesting to note that the general method of making up this sheet is very similar to that in use now, the principal difference being that the actual weights of the cars as loaded are now used in place of the assumed weights of this early table. Also no allowance seems to have been made in this rating for weather conditions, such as low temperatures and head or side winds.

TABLE OF TRAIN LOADS.											
47,000 lbs.	39,500 lbs.	41,500 lbs.	31,300 lbs.	36,000 lbs.	28,000 lbs.	46,000 lbs.	37,800 lbs.	29,800 lbs.			
Coal, Coke, Rails and Grain.	Cattle Horses.	D. D. Hogs.	S. D. Hogs.	D. D. Sheep.	S. D. Sheep.	E. B. Grain.	E. B. Mdse.	W. B. Mdse. or Line Frt.			
5	6	6	8	7	8	5	6	8	10		
10	12	11	15	13	17	10	12	16	20		
12	14	14	18	16	20	12	15	19	24		
14	17	16	21	18	24	14	17	22	28		
16	19	18	24	21	27	16	20	25	32		
18	21	20	27	24	30	18	22	28	36		
20	24	23	30	26	34	20	25	32	40		
22	26	25	33	29	37	22	27	35	44		
24	29	27	36	31	40	25	30	38	48		
26	31	29	39	34	44	27	32	41	52		
28	33	32	42	37	47	29	35	44	56		
30	36	34	45	39	50	31	37	47	60		
32	38	36	48	42	54	33	40	50	64		
34	40	39	51	44	57	35	42	54	68		
36	43	41	54	47	60	37	45	57	72		
38	45	43	57	50	64	39	47	60	76		
40	48	45	60	52	67	41	50	63	80		

NOTE.—Weight of empty car, 18,500 lbs.

General News Section.

The two grain elevators of the Canadian Pacific at Owen Sound, Ont., were destroyed by fire December 11, together with their contents—about a million bushels of wheat, oats and barley.

Ninety-eight new station buildings have been opened during the past year on the new line of the Grand Trunk Pacific Railway out of 150 contracted for in the spring; and 27 more are now under construction.

The Interborough Rapid Transit Company, New York City, has set aside about \$40,000 to be given to its employees as Christmas presents. A five-dollar gold piece will be given to each employee whose pay is \$110 a month, or less, and who has been in the service a year.

Nine locomotives were destroyed at Houlton, Me., December 20, in a fire which burned the roundhouse of the Bangor & Aroostook. Five locomotives were removed before the flames made it impossible to enter the structure. The blaze started from an unknown cause in a small office connected with the roundhouse, and both buildings were destroyed.

The Pennsylvania Lines have recently built at the Altoona shops 10 all-steel dining cars which are to be used on the Pennsylvania Special, the Manhattan Limited and other expresses between Chicago and Pittsburgh. In the construction of these cars, platforms and vestibules have been omitted, allowing room for a larger kitchen and for 36 seats instead of the usual 30.

Telegraph operators on the Cincinnati, Hamilton & Dayton have been given an advance in wages of about 5 per cent.

A committee representing the telegraph operators employed by the Chesapeake & Ohio is holding conferences with the management at Richmond, Va., concerning demands that have been presented for an increase in wages and changes in working conditions.

Several of the leading railways entering St. Louis will soon have their offices in one building. The Missouri Pacific, the St. Louis, Iron Mountain & Southern, the Missouri, Kansas & Texas, the Chicago, Burlington & Quincy, and the St. Louis Southwestern have leased space for general offices on several floors in the Monadnock building, now being put up. The building is to occupy the entire block bounded by Olive, Locust, Sixth and Seventh streets.

The *New York Journal of Commerce* annual canvass of the number of stockholders of the principal large corporations in the United States this year covers 234 railway and industrial corporations, of which 91 are railways, with a capitalization of \$5,431,852,174. The number of stockholders of the railways is 389,571, the average holdings being 139½ shares. This is an increase over 1910 of 29,275 in the total number of railway stockholders, which equals 8 per cent. The increase in railway capital is \$97,654,274, or about 2 per cent.

Bills for the construction of a national railway in Alaska have again been introduced in Congress. One presented by Representative Anderson of Minnesota directs the president to have a line surveyed from Seward to the Matanuska coal fields. Provision is made for the appointment of a commission of five members, two of whom must be engineers, one an officer of the army, one an officer of the navy, and the fifth a resident of Alaska familiar with mining conditions. A bill drafted by T. C. Whiteley, of Guthrie, Okla., empowers the commission which is to build the road to have coal mined.

The Delaware, Lackawanna & Western announces that on Sunday next its passenger trains will begin using the new cut-off between Lake Hopatcong, N. J., and Delaware Water Gap, 28.5 miles. With the use of this line the distance by the Lackawanna from New York to Buffalo will be 400 miles, or about ten miles shorter than by the old line, and the route by the old line was shorter than any of its competitors. The new line has but 15 curves as against 57 on the old and the ruling grade is 0.55 per cent. On the old line between the points named there are two tunnels. The new line is through mountainous country and has cost \$421,000 a mile.

Rain on the Isthmus.

All records for excessive rainfall for short periods on the Isthmus of Panama were broken at Porto Bello on the night of November 28-29, when 2.46 in. of rain fell in three minutes, between 2:07 and 2:10 a. m. The highest previous records of excessive rainfall were 0.75 of an inch in five minutes at Rio Grande in July, 1908, and 1.24 in. in 10 minutes at Balboa in August, 1908. The total rainfall in the shower at Porto Bello was 7.60 in.

Noise Nuisances.

A firm of builders in New York was fined \$350 by the supreme court of the state for failing to obey an order of the court to abate a noise nuisance. This is one more step in the right direction. The time will eventually come when people generally will rise up in protest against the tumult of sound that is unnecessarily raised. Noises have become the bane of life in cities and towns [and in many country places], and when the fight against them was first started the agitators were looked upon as cranks. That day has passed. Speed the day that will bring some actual relief. Two-thirds of the noises of a city could be abated if the makers thereof gave a little consideration to their fellow-men. As long as they won't do it voluntarily, let the court compel them.—*Pittsburgh Post*.

Sappers and Miners at Pittsburgh.

Because the Pittsburgh & Lake Erie Railroad has not paid its rent for the use of city property on the south side of Pittsburgh for the last eight years, the city has started to collect its bill of \$18,000 by tearing up the tracks on its property. A large gang of laborers was sent to the yard at Twenty-third and Sidney streets this morning, accompanied by an escort of policemen, and at once began to tear up the tracks.

Locomotives pushed loaded cars on to the disputed tracks. The police tried to stop this, but the railway men paid no attention, and more police were sent for. Tonight about 500 policemen are on duty at the yards and the laborers are still digging away.

They have removed the earth and ties from under the cars, leaving only such ties as are weighted down by the wheels, and now the railway cannot remove its cars, for the first move will break down the rails.—*Press despatch*.

Billions of Papers.

The House Committee on Expenditures in the Post Office Department has made a report on the volume, weight and handling of the publications of the country during the last fiscal year, giving figures based on reports from 10,000 publishers. These 10,000 report an annual output of more than 6,500,000,000 copies, weighing 1,750,000,000 pounds.

The postal service handled 951,001,669 pounds, and, excluding 500,000 pounds carried free within counties, it received one cent a pound. The publishers reported that they delivered by their own carriers, newsboys, and news companies 840,466,574 pounds, part of which was carried to destination by express or otherwise by rail; by express 202,729,510 pounds, and other rail shipments 121,491,748 pounds.

The rate by express and rail varied from 2½ mills to one cent a pound, but the bulk of these shipments went at a rate of ¼ to ½ cent. Inquiry was made of all publishers, approximately 30,000, of which nearly 17,000 are weekly publications. The 10,000 returns received include probably 66 per cent. of all the tonnage of publications.

Disastrous Collision at Odessa, Minn.

In a rear collision on the Chicago, Milwaukee & St. Paul at Odessa, Minn., 173 miles west of Minneapolis, on the morning of December 18, about four o'clock, ten or more persons were killed and 12 or more injured. The eastbound express train "The Columbian," which had just stopped at Odessa, was run into at the rear by the second section of the same train, consisting only of express cars loaded with silk. The steel sleeping car at the

rear of the standing train was crushed for nearly its whole length. Most of the victims were in this car, and included among the killed were the wife and daughter of J. F. Richards, superintendent of the Chicago, Milwaukee & Puget Sound, at Mobridge. The engineman of the silk train was killed. This line is worked by the manual block system and the company says that the signal at the entrance of the block section was not put in the stop position behind the passenger train, the error having been occasioned in some way by the signal man going off duty at about the time this train passed. The flagman of the passenger train also is blamed for having failed to perform his duty. The silk train was running at very high speed and the engine tore its way almost to the middle of the sleeping car, and this car was also crushed at the front end by the steel dining car which was next ahead of it.

Increasing Safety on the North Western.

R. C. Richards, general claim agent and chairman of the Central Safety Committee of the Chicago & North Western, described the organization and operation of the safety committee system, as worked out on the North Western during the past year, in an address before the Industrial Safety Conference at St. Paul, on December 7. He said in part:

"There are now about 500 officers and men serving on these safety committees, and if Benjamin Franklin's old saying that the eyes of the master can do more work than both of his hands is true, surely 500 pairs of eyes trained to look for defective conditions and practices can do more work than the eyes of one person, and from the results that have been attained for the last eleven months (during which time the earnings of the company decreased less than 2 per cent.) this effort to bring about greater safety shows a wonderful improvement in matter of cleaning up yards, station platforms, shops and roundhouses of obstructions, cleaning windows, putting up railings at dangerous places, and covering gearing of machines, which has not only brought about greater safety of operation, but also more efficient operation, and we also show the following reductions in our accident record:

47	per cent. in trainmen killed.
40.8	per cent. in trainmen injured.
30.7	per cent. in switchmen killed.
18.5	per cent. in switchmen injured.
50	per cent. in stationmen killed.
10.5	per cent. in stationmen injured.
32	per cent. in trackmen injured.
34	per cent. in bridgemen injured.
11.4	per cent. in shop and roundhouse men injured.
85	per cent. in car repairers and inspectors killed.
Total reduction of 17 employees killed;	
Total reduction of 2,144 employees injured;	
or, 27.7 per cent.	
70	per cent. in passengers killed.
10	per cent. in passengers injured.

"If this is an indication of what we can do in the future, it would certainly seem to show that the plan which we have adopted, in which enthusiasm and co-operation for safety is the key note, will surely result as the years go by in greater safety and regularity, which is what we all want."

Mr. Richards stated that credit for initiation of the safety committee movement should be given to the Illinois Steel Company and to Robert W. Campbell, the chairman of the central committee of safety of that company. The same safety organization as that adopted by the North Western has since been put into effect on the Delaware, Lackawanna & Western, the Elgin, Joliet & Eastern, the Baltimore & Ohio, and the Frisco system; and other roads are now considering it.

German Railways in Africa.

The Reichstag has just passed the first reading of a bill to extend the construction of the Central Railway of German East Africa to Lake Tanyika. The German railways in Africa already authorized, including those in operation, amount to 2,585 miles, of which 733 miles are in East Africa, 322 miles in Kamerun, 201 miles in Togo and 1,318 miles in South West Africa. Of this mileage, 2,131 miles are in operation, of which 444 miles have been opened to traffic since the beginning of the year. The most important line at present under construction is the railway which begins at Dar-es-Salaam and is now within about 37 miles of Tabora, the chief trading town on the tableland south of Lake Victoria Nyanza, and will reach that town by next spring. An-

other railway in the same colony is the Usambara, which begins at Tanga, on the coast, and extends to the northwest through the Usambara mountains. Of this line, 218 miles are in operation. Of the Dar-es-Salaam Railway, 442 miles are in operation. To Tabora is 83 miles more, and a further extension of 254 miles to the lake is proposed. It will reach Tanyika at Kigoma, a few miles north of Ujiji. It is intended to establish a steamer service on the lake after the completion of the railway.

Committees of Railway Signal Association, 1912.

COMMITTEES OF THE BOARD OF DIRECTORS.

Committee Work and Personnel.—B. H. Mann, chairman; C. A. Christofferson, C. E. Denney, W. H. Higgins.

The Manual.—W. J. Eck, chairman; H. S. Balliet, C. C. Rosenberg.

Places for Conventions.—G. S. Pflasterer, chairman; Geo. Boyce, E. W. Newcomb.

Convention Arrangements.—F. P. Patenall, chairman; W. J. Eck, C. C. Rosenberg, M. E. Smith, T. S. Stevens.

Co-operating Committee of the Signal Appliance Association.—Azel Ames, chairman; W. P. Hawley, L. G. Martin.

COMMITTEES OF THE ASSOCIATION.

Committee I.—Signaling Practice.—A. H. Rudd (Penn.), chairman; L. R. Clausen (C. M. & St. P.), vice-chairman; C. C. Anthony (Penn.); H. S. Balliet (N. Y. C.); C. A. Christofferson (No. Pac.); C. E. Denney (L. S. & M. S.); W. J. Eck (Southern); W. H. Elliott (N. Y. C.); G. E. Ellis (Kan. C. T.); A. S. Ingalls (L. S. & M. S.); J. C. Mock (Mich. Cent.); F. P. Patenall (B. & O.); J. A. Peabody (C. & N. W.); W. B. Scott (U. P.); A. G. Shaver (C. R. I. & P.); T. S. Stevens (A. T. & S. F.); H. H. Temple (B. & O.); J. C. Young (U. P.). Outline of work: (a) Make such further report on a uniform system of signaling as may seem advisable as a result of the action of the association. (b) Investigate the applicability of the "AGA" flashlight, especially as a means of making a distinction in night signal aspects.

Committee II.—Mechanical Interlocking.—C. J. Kelloway (A. C. L.), chairman; F. C. Stuart (G. H. & S. A.), vice-chairman; L. Brown (A. T. & S. F.); G. W. Chappel (N. Y. N. H. & H.); W. H. Fenley (Panama); E. C. Graham (B. & A.); E. Hanson (G. C. & S. F.); E. J. Hawkins (N. Y. C.); Wm. Hiles (C. C. & St. L.); J. A. Johnson (M. K. & T.); T. A. Jones (Penn.); T. E. Kirkpatrick (L. S. & M. S.); J. B. Lamb (Southern); J. W. McClelland (P. & R.); E. E. Mack (C. & E. I.); S. Miskelly (C. R. I. & P.); W. B. Morrison (D. L. & W.); Charles Stephens (C. & O.); J. I. Vernon (N. Y. N. H. & H.); W. F. Zane (C. B. & Q.). Outline of work: (a) Prepare specifications for apparatus and materials. (b) Continue investigation of a device for power-operated home signals equivalent to a bolt-lock. (c) Prepare standard designs for cement floor and lead-out.

Committee III.—Power Interlocking.—B. H. Mann (Mo. Pac.), chairman; R. C. Johnson (N. Y. C. & H. R.), vice-chairman; Burt Anderson (A. T. & S. F.); W. H. Arkenburgh (C. R. I. & P.); E. J. Clark (Penn.); M. H. Collins (Hudson & M.); J. R. Decker (Mich. Cent.); A. B. Du Bray (St. L. & S. F.); J. D. Elder (Kan. City Term.); C. B. Gray (Penn. Lines West); W. H. Harland (N. Y. O. & W.); H. H. Harman (B. & L. E.); W. N. Manuel (G. R. & I.); G. A. Motry (B. & O.); H. H. Orr (C. & E. I.); W. M. Post (Penn.); I. S. Raymer (P. & L. E.); D. W. Rossell (N. Y. C.); O. R. Unger (Mo. Pacific); F. B. Wiegand (L. S. & M. S.); G. A. Ziehlke (U. P.). Outline of work: (a) Prepare specifications for apparatus and materials. (b) Continue investigation of a device equivalent to a bolt-lock. (c) Continue the preparation of typical circuit plans for electric interlocking. (d) Prepare plans of wire ducts and terminal boxes. (e) Prepare specifications for protection of drawbridges. (f) Investigate the use of "battery" indication on semi-automatic power-operated signals. (g) Chairmen of Committees III, IV, and VIII, prepare a classification of voltage ranges for signal work, to be reported by Committee III.

Committee IV.—Automatic Block.—A. G. Shaver (C. R. I. & P.), chairman; J. M. Fitzgerald (N. Y. C.), vice-chairman; E. L. Adams (L. S. & M. S.); E. E. Bradley (W. Md.); G. H. Dryden (B. & O.); A. R. Fugina (L. & N.); J. E. Gillmor

(Penn.); R. E. Greene (Mich. C.); W. R. Hastings (C. R. I. & P.); W. H. Higgins (C. of N. J.); B. F. Hines (N. O. & N. E.); E. W. Kolb (B. R. & P.); E. W. Newcomb (Oregon S. L.); C. W. Parker (C. P.); R. M. Phinney (C. & N. W.); H. J. Rhinehart (D. L. & W.); A. H. Rice (D. & H.); G. W. Trout (Pere Marquette). Outline of work: (a) Prepare revised specifications for direct-current relays and direct-current indicators. (b) Continue preparation of specifications for apparatus and materials. (c) Prepare typical automatic-signal circuits for single and double track.

Committee V.—Manual Block.—T. S. Stevens (A. T. & S. F.), chairman; L. R. Mann (Mo. Pacific), vice-chairman; E. T. Ambach (C. H. & D.); Hadley Baldwin (C. C. & St. L.); J. Beaumont (C. G. W.); J. H. Cormick (N. P.); H. J. Foale (Wabash); M. J. Fox (C. B. & Q.); G. A. Guyer (N. Y. C.); H. K. Lowry (C. M. & St. P.); G. S. Pflasterer (N. C. & St. L.). Outline of work: (a) Investigate the relative advantages and relative cost of manual block systems (manual, controlled manual and staff). (b) Prepare rules for the maintenance and operation of interlocking plants and block signals. (c) Investigate methods of handling trains by signal indications without train orders.

Committee VI.—Standard Designs.—J. C. Mock (Mich. Cent.), chairman; J. A. Peabody (C. & N. W.), vice-chairman; G. E. Ellis (K. C. Term.); F. P. Patenall (B. & O.); A. H. Rudd (P. R. R.); M. E. Smith (D. L. & W.); R. E. Trout (St. L. & S. F.); J. C. Young (U. P.). Outline of work: (a) Continue preparation of standard design. (b) Devise and use on drawings a system of symbols (preferably based on the drawing numbers) for designation of parts. (c) Prepare design of detector bar.

Committee VII.—Subjects and Definitions.—E. G. Stradling (C. I. & L.), chairman; A. D. Cloud, *The Signal Engineer*; C. G. Stecher (C. & N. W.). Outline of work: (a) Prepare definitions for technical terms. (b) Compile these definitions in the form of a signal dictionary, giving terms and definitions only, without descriptive matter.

Committee VIII.—Electric Railway and Alternating Current Signaling.—H. S. Balliet (N. Y. C.), chairman; C. H. Morrison (N. Y. N. H. & H.), vice-chairman; W. P. Allen (Penn.); W. F. Follett (N. Y. N. H. & H.); E. C. Grant (U. P.); W. F. Hudson (N. Y. C.); John Leisenring (Ill. Traction); H. A. Logue (Cumb. Valley); W. W. Morrison (N. Y. C.); C. R. Peddle (Interboro R. T.); B. H. Richards (C. R. I. & P.); John Roberts (New York, Westchester & B.); J. E. Saunders (A. T. & S. F.); E. B. Smith (N. Y. C.); W. N. Spangler (Penn.); F. S. Starratt (S. P.); F. E. Wass (N. Y. C.); J. R. Wills (O. S. L.); J. A. Beoddy (N. & W.). Outline of work: (a) Continue investigation of systems in operation. (b) Prepare requisites of apparatus and material for an a. c. automatic block signal system. (c) Prepare specifications for those items referred to in the portion of report made up by Sub-Committee B, 1911, which in the opinion of the committee cannot be covered by reference to specifications prepared by other committees.

Committee IX.—Wires and Cables.—W. H. Elliott (N. Y. C.), chairman; E. L. Adams (L. S. & M. S.), vice-chairman; W. L. Dryden (S. I. R. T.); A. B. Himes (B. & O.); J. D. Phillips (P. & R.); D. W. Richards (N. & W.); E. L. Watson (Penn.); J. V. Young (B. & M.); J. W. Young (Erie). Outline of work: (a) Continue investigation and tests with a view to improving the specifications for mineral-matter, rubber-compound, insulated signal wire. (b) Prepare specifications for copper-clad steel bond wire. (c) Prepare specifications for 30 per cent. conductivity, hard-drawn copper-clad steel line wire. (d) Prepare specifications for wire and cables for high-tension circuits.

Special Committee.—Contracts.—L. R. Clausen (C. M. & St. P.), chairman; Geo. Boyce (C. St. P., M. & O.); C. A. Christofferson (N. P.); R. L. Davis (Mich. Cent.); R. L. Huntley (U. P.); J. B. Latimer (C. B. & Q.); E. B. Pry (Penn. Lines West); L. S. Rose (C. C. & St. L.). Outline of work: (a) Continue preparation of forms of contracts for joint interlocking plants. (b) Prepare table of arithmetical values of operated units.

Special Committee.—Method of Recording Signal Performance.—H. W. Lewis (L. V.), chairman; D. M. Case (C. N. O. & T. P.), vice-chairman; E. C. Hitchcock (N. Y., N. H. & H.); D. R. Morris (I. C.); W. B. Weatherbee (D. L. & W.); F. E. Whitcomb (B. & A.); L. L. Whitcomb (L. S. & M. S.). Outline

of work: Continue preparation of forms and instructions for recording signal failures.

Special Committee.—Storage Battery.—R. B. Ellsworth (N. Y. C.), chairman; G. E. Beck (L. S. & M. S.); J. Fred Jacobs (C. of N. J.); T. L. Johnson (D. L. & W.); A. H. McKeen (O. W. R. & N.); A. H. Yocum (P. & R.). Outline of work: (a) In consultation with representatives of manufacturers, review adopted specifications and designs for storage batteries and recommend necessary revisions. (b) Investigate jelly electrolyte.

Central Railway Club.

The annual meeting and dinner of the Central Railway Club will be held at the Statler hotel, Buffalo, N. Y., on January 11. The executive committee will meet at the Statler hotel at 1 p. m. The features of the business session in the afternoon will be the annual reports, a paper by Prof. Edward C. Schmidt of the University of Illinois, on Tonnage Rating of Engines, and amendments of the constitution and by-laws will be voted upon. In addition to a programme of vocal and instrumental music there will be addresses by Percy R. Todd, vice-president of the Bangor & Aroostook; H. L. Joyce, manager marine department, Central of New Jersey; D. R. Macbain, superintendent of motive power, Lake Shore & Michigan Southern, and the Hon. Charles A. Pooley. W. G. Besler, vice-president and general manager of the Central of New Jersey, will be toastmaster.

Western Railway Club.

The regular monthly meeting of the Western Railway Club was held at the Auditorium hotel, Chicago, December 19. The paper of the evening was entitled Terminal Brake Testing, by F. B. Farmer, Westinghouse Air Brake Company, Pittsburgh, Pa.

American Institute of Consulting Engineers.

The annual meeting of the American Institute of Consulting Engineers will be held on January 16, at the Aldine Club, New York. Eugene W. Stern, 103 Park avenue, is secretary.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

- AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.; annual, May 7-10, Richmond, Va.
- AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Boston, Mass.
- AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—W. C. Hope, New York; next convention, Seattle, Wash.
- AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, East St. Louis, Ill.; annual, June 18-21, Chicago.
- AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—O. G. Fetter, Carew building, Cincinnati, Ohio; 3d Friday of March and September; annual, March 17, Chicago.
- AMERICAN ELECTRIC RAILWAY ASSOCIATION.—H. C. Donecker, 29 W. 39th St., New York.
- AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOCIATION.—George Keegan, 165 Broadway, New York. Meetings with annual convention American Electric Railway Association.
- AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York.
- AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Next annual convention, third week in October, 1912, Baltimore, Md.
- AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, Monadnock Block, Chicago; annual convention, March 19-21, 1912, Chicago.
- AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago. Annual convention, June 17-19, Atlantic City, N. J.
- AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—M. H. Bray, N. Y., N. H. & H., New Haven, Conn.
- AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.
- AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., New York; 1st and 3d Wed., except June and August, New York.
- AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Wemlinger, 13 Park Row, New York; 2d Tuesday of each month, New York.
- AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.
- ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago; annual, June 26, 1912, Quebec, Que.
- ASSOCIATION OF RAILWAY CLAIM AGENTS.—J. R. McSherry, C. & E. I., Chicago; annual convention, May 22, 1912, Los Angeles, Cal.
- ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago.
- ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 135 Adams St., Chicago; annual, June 24, 1912, New York.
- ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and Aug., Montreal.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursdays, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Thurs. in Jan. and 2d Fri. in March, May, Sept., Nov., Buffalo, N. Y.

CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—D. F. Jurgensen, 116 Winter St., St. Paul, Minn.; 2d Monday, except June, July and Aug., St. Paul.

ENGINEERS SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.; 1st Monday after 2d Saturday, Harrisburg, Pa.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 803 Fulton building, Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Richmond, Va.; annual, May 15, Buffalo, N. Y.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—E. S. Koller, 226 W. Adams St., Chicago; Wed. preceding 3d Thurs., Chicago.

INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, rue de Louvain, 11 Brussels; 1915, Berlin.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, Brown Marx building, Birmingham, Ala.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio. Convention, August 15, Chicago.

IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August, Des Moines.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York; annual convention, May 14-17, Pittsburgh, Pa.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago. Annual convention, June 12-14, Atlantic City, N. J.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION, OF UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass.; next annual convention, second week in September, 1912.

NATIONAL RAILWAY APPLIANCE ASSOCIATION.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Meetings with annual convention American Railway Engineering Association.

NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.

NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August, New York.

NORTHERN RAILWAY CLUB.—C. L. Kennedy, C., M. & St. P., Duluth, Minn.; 4th Saturday, Duluth.

OMAHA RAILWAY CLUB.—H. H. Maulick, Barker Block, Omaha, Neb.; second Wednesday.

RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 2 Rector St., New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Railway Electrical Engineering Association.

RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, St. L. S. W. Ry., St. Louis, Mo.; annual, May 12, 1912, Kansas City, Mo.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Bethlehem, Pa.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio.

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 2135 Oliver Bldg., Pittsburgh, Pa. Meetings with annual conventions M. M. and M. C. B. association.

RAILWAY TELEGRAPH & TELEPHONE APPLIANCE ASSOCIATION.—W. E. Harkness, 284 Pearl St., New York. Meetings with Railway Telegraph Superintendents' Association.

RICHMOND RAILROAD CLUB.—F. O. Robinson, Richmond, Va.; 2d Monday, except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling; September, 1912, Buffalo, N. Y.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmonds, 3838 Park Ave., New York. Meetings with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., Atlanta.

TOLEDO TRANSPORTATION CLUB.—J. G. Macomber, Woolson Spice Co., Toledo, Ohio; 1st Saturday, Toledo.

TRAFFIC CLUB OF CHICAGO.—Guy S. McCabe, La Salle Hotel, Chicago; meetings monthly, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie, Pittsburgh, Pa.; meetings monthly, Pittsburgh.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7042 Stewart Ave., Chicago; annual, June 18, 1912, Louisville, Ky.

TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; first Saturday after first Wednesday.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, L. S. & M. S., Detroit, Mich.; meetings monthly.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y.; August, 1912.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony building, Chicago; 3d Tuesday of each month, except June, July and August.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago; 1st Wednesday in month except July and August, Chicago.

WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Baltimore, Md.; annual, January 16-18, Chicago.

Traffic News.

The Erie is to put on a train for Wells Fargo & Co.'s express which will run from Jersey City to Chicago in 24 hours, leaving Jersey City at 8 p. m.

J. C. Lincoln has resigned as commissioner of the traffic bureau of the Merchants' Exchange of St. Louis. Mr. Lincoln was for three years president of the National Industrial Traffic League.

The Maine Central has acquired a controlling interest in the stock of the Ricker Hotel Company, owner of "Hotel Sam-O-Set," a large summer hotel at Rockland breakwater, near Rockland, Me.

The American Refrigerator Transit Company has established new weekly refrigerator service during the winter between St. Louis and Minneapolis, cars leaving St. Louis Saturday night and arriving at the Twin Cities Monday morning.

The Western Classification Committee has announced that classification No. 51 will be mailed about January 1. The docket for the semi-annual meeting to be held at the Hotel Galvez, Galveston, Tex., on January 16, will be mailed to shippers on December 28.

W. A. Schumacher, assistant traffic manager of Armour & Company at Chicago, has been appointed general traffic manager of the United Fruit Company, with headquarters in New York City. He will have jurisdiction over the traffic of the railway and steamship lines of the company.

The regular meeting of the Traffic Club of New York will be held at the Waldorf-Astoria Hotel, December 26. This will be a club night, including a discussion on the subject Our Merchant Marine. The president will make a short address, to be followed by other members. The Corinthian male quartet will render a number of popular selections. The annual dinner will be held in the Waldorf-Astoria on February 2. Speakers have already been secured.

The Winnipeg Board of Trade has decided to petition the Railway Commission of Canada to find some solution of the car shortage problem in western Canada. The board said the railways have failed to fulfill their duties as common carriers and the congestion has resulted in the detention of quantities of grain in transit.

Shippers of the Imperial valley, California, have filed a request with the state railway commission that the Southern Pacific be required to make the same freight rate on butter as that which the San Joaquin valley shippers enjoy by express. They also ask a readjustment of the rates on oil, cottonseed and cottonseed meal.

A reporter in Oklahoma City, investigating the subject of Oklahoma's greatness, finds that in his city there are 20 regularly established railway city ticket or freight offices; which number, however, includes a few electric railways. Besides these, there are 18 other (steam) roads, whose traveling agents visit Oklahoma City one, two or three times a week.

Railways in the Central Freight Association have notified the iron and steel manufacturers of the Mahoning and Shenango valleys that they have decided not to grant the petition of the manufacturers for a reduction in rates from the lakes on ore. It is said the manufacturers may file a complaint with the interstate commerce commission attacking the present rates.

The Philadelphia & Reading, beginning January 1, will increase round-trip local passenger rates to the basis of 2¼ cents a mile. Heretofore the rates for round-trip tickets have not been uniform. Following are examples of the changes made: Philadelphia to Germantown, old rate 28 cents, new 31; to Reading, old rate \$2.34, new \$2.61; to Harrisburg, old \$4.20, new \$5.04.

The probable effect of the operation of the Panama canal on the traffic relations of the country is to be one of the principal topics for consideration at the spring meeting of the National Industrial Traffic League in Chicago on March 14. A series of questions regarding the canal and its effect on commerce is to be addressed to all members of the League for the purpose of obtaining a comprehensive digest of opinions.

The Great Northern is conducting an extensive advertising campaign for the purpose of bringing before the public the advantages of Washington, Montana and Oregon as apple-growing states. During the month of December the company is conducting apple exhibits in Boston, New York, Philadelphia, Buffalo, Chicago, St. Louis, Des Moines, Milwaukee, St. Paul, Minneapolis, Sioux City, Superior, Duluth, Fargo and Winnipeg.

It is reported that the Texas Railway Commission is planning to order the dissolution of the Texas Tariff Bureau, recently organized by the railways of the state, because its intended function does not meet with the approval of the commissioners. A hearing is to be held before the commission some time in January, at which the representatives of the railways will be given an opportunity to appear and explain the proposed methods of the bureau.

The principal railways south of the Potomac and Ohio rivers and east of the Mississippi, will, on January 7, put on sale "interchangeable penny scrip books," to take the place of mileage books; and these will be honored by substantially all of the railways in the territory named. Each book will contain 2,500 coupons of the value of 1 cent each, and it will be sold, for the purchaser's own use, at \$20. Coupons are to be presented at ticket offices for tickets.

Beginning January 15, the Atchison, Topeka & Santa Fe will run an agricultural demonstration train throughout its lines in New Mexico, arrangement for the lectures and demonstrations having been made with the State Agricultural College. The train will be in charge of J. D. Tinsley, the railway company's agricultural demonstrator, who will be accompanied by C. L. Seagraves, general colonization agent. One of the lecturers will be President W. E. Garrison of the Agricultural College.

The Illinois Central has announced that it will establish 15 experimental farms along its lines in Mississippi and Louisiana to encourage agricultural development by inculcating the principles of correct farming. Each farm is to consist of a 40-acre tract, to be worked by the owner under the supervision of instructors from the Agricultural College of Mississippi and the agricultural department of the University of Louisiana. Each of the tracts selected for the purpose is to be centrally located so that the farmers of the district may reach them easily. The railway proposes to enter into contracts with the owners of the land guaranteeing them against loss.

In accordance with a plan decided upon at the recent annual convention of the American Association of General Passenger and Ticket Agents, an official digest of fares and division arrangements for all railways in the United States, Canada and Mexico is to be compiled and published under the auspices of the Transcontinental Passenger Association. The work is to be under the supervision of a committee consisting of C. A. Cairns, general passenger and ticket agent of the Chicago & Northwestern (chairman); O. P. McCarthy, passenger traffic manager of the Baltimore & Ohio, and W. A. Russell, general passenger agent of the Louisville & Nashville. It is expected that copies may be ready for distribution about May 1. Heretofore for many years a similar compilation has been made and published unofficially. It has decided that better results might be obtained by having its publication undertaken under the auspices of the association.

The annual dinner of the Traffic Club of St. Louis was held on December 9 at the Mercantile Club. A. Hilton, president of the club, presided as toastmaster, and addresses were made as follows: S. O. Dunn, editor of the *Railway Age Gazette*, on Co-operation of Shippers and Railways Regarding Regulation; D. R. Forgan, president of the National City Bank of Chicago, on The National Reserve Association of the United States; L. C. Boyle, of Kansas City, on The Business Man and His Duty to Society, and L. J. Wortham, of Fort Worth, Tex., on The Work of Commercial Secretaries and the Business Men's Association of Texas. At the annual meeting of the club the following were elected officers for the ensuing year: President, A. Hilton, general passenger agent, St. Louis & San Francisco; vice-presidents, J. C. Lincoln, commissioner, Merchants Exchange Traffic Bureau; B. M. Flippin, freight traffic manager, Missouri Pacific Railway; J. L. Ponney, traffic manager, Terminal Railroad Association; A. M. Field, traffic manager,

Wrought Iron Range Company; Geo. Danner, traffic manager, Meyer Brothers Drug Company; secretary-treasurer, A. F. Versen, assistant traffic commissioner, Business Men's League of St. Louis.

Department of Agriculture Final Crop Report.

In making the final estimate of the acreage and production of crops in 1911, the bureau of statistics has used the census report of the acreages in 1909 as a basis, from which revised estimates for both 1910 and 1911 crops are made. Using these figures as a basis, the crop reporting board estimates the acreage, production and value of important farm crops of the United States in 1910 and 1911 to have been approximately as follows:

Crops.	Acreage. (000 omit'd.) Acres.	Production. (000 omit'd.) Bushels. (*)	Farm Value, December 1.	
			Per Bu. Cents.	Total. (000 omit'd.) Dollars.
Corn, 1911	105,825	2,531,488	61.8	1,565,258
Corn, 1910	104,035	2,886,260	48.0	1,384,817
Corn, 1909	98,383	2,552,190	59.6	1,521,105
Winter Wheat, 1911	29,162	430,656	88.0	379,151
Winter Wheat, 1910	27,329	434,142	88.1	382,318
Spring Wheat, 1911	20,381	190,682	86.0	163,912
Spring Wheat, 1910	18,352	200,979	88.9	178,733
All Wheat, 1911	49,543	621,338	87.4	543,063
All Wheat, 1910	45,681	635,121	88.3	561,051
All Wheat, 1909	44,261	683,350	99.0	676,517
Oats, 1911	37,763	922,298	45.0	414,663
Oats, 1910	37,373	1,180,513	34.4	406,406
Oats, 1909	35,159	1,007,129	40.5	407,887
Barley, 1911	7,627	160,240	86.9	139,182
Barley, 1910	7,743	173,832	57.8	100,426
Barley, 1909	7,698	173,321	55.2	95,673
Rye, 1911	2,097	33,119	83.2	27,557
Rye, 1910	2,185	34,897	71.5	24,953
Rye, 1909	2,196	29,520	73.9	21,815
Buckwheat, 1911	833	17,549	72.6	12,735
Buckwheat, 1910	860	17,598	66.1	11,636
Buckwheat, 1909	878	14,849	69.9	10,379
Flaxseed, 1911	2,757	19,370	\$1.82	35,272
Flaxseed, 1910	2,467	12,718	\$2.32	29,472
Flaxseed, 1909	2,083	19,513	\$1.53	29,855
Rice—Readjustment of Rice data to Census basis deferred.				
Rice, 1911	696	22,934	79.7	18,274
Rice, 1910	722	24,510	67.8	16,624
Potatoes, 1911	3,619	292,737	79.9	233,778
Potatoes, 1910	3,720	349,032	55.7	194,566
Potatoes, 1909	3,669	389,195	54.9	213,668
Hay—Readjustment of Hay data to Census basis deferred.				
Hay, 1911	43,017	†47,444	†\$14.64	694,570
Hay, 1910	45,691	†60,978	†\$12.26	747,769

* Bushels of weight. † Tons (2,000 lbs.). ‡ Per ton.

North Western-Northern Pacific Traffic Arrangement.

The "North Coast Limited" train heretofore of the Northern Pacific, made its initial trip out of Chicago over the Chicago & Northwestern (via Milwaukee and Wyeville), on Sunday, December 17. The train consists of an observation-library car with barber shop and bath, two 10-section standard drawing room and compartment cars, a 14-section standard drawing room and smoking compartment car, an 18-section tourist car, a combination coach and smoker, a dining car and a combination baggage and dynamo car. The train leaves Chicago west-bound at 10 p. m., arriving at Tacoma and Seattle at 8:15 p. m. the third day. Eastbound it leaves Tacoma at 7 p. m. and arrives in Chicago at 9 p. m.

President W. A. Gardner of the Northwestern says that the installation of through service is anything that may be considered unusual or extraordinary. It is a new route for new business. The arrangement is not exclusive; it in no wise interferes with nor alters similar joint service which all the interested lines have maintained for years with other roads not parties to this particular service. The mileage via the new low-grade line is practically identical with the old, and service will be maintained on a parity over the two routes. Long-distance travel is reluctant to change cars west of Chicago and is always fearful of missing connections, and the inauguration of this through train service is in response to public necessity.

Car Surpluses and Shortages.

Arthur Hale, chairman of the committee on relations between railways of the American Railway Association in presenting statistical bulletin No. 109, giving a summary of car shortages

and surpluses by groups from August 3, 1910, to December 6, 1911, says:

"The figures reported for the period ending December 6, 1911, show a total surplus of 53,840 cars, an increase of 10,781 cars over the preceding period, or 25 per cent. The increase in surplus is reported throughout the country and most noticeable in the coal cars, that class of car increasing from 12,346 cars on November 22, 1911, to 20,662 cars on December 6, 1911, an increase of 8,316 cars. Of the 8,316 coal car increase, 4,187 cars are reported in group 2 (New York, New Jersey, Delaware, Maryland, eastern Pennsylvania) and 2,343 cars in group 3 (Ohio, Indiana, Michigan, western Pennsylvania). The box car surplus increased 500 cars over the last report, and flat and miscellaneous cars increased 928 and 1,037 cars, respectively, making a total increase of 17,781 cars.

"All classes of cars, flats excepted, show decreases in car shortage. Box decreased 401 cars, coal decreased 1,267 cars and miscellaneous decreased 638 cars. Flat cars show an increase of 54 cars, making a total decrease of 2,252 cars. It will be noted that the situation with regard to car surplus is practically the same as one year ago, the total surplus being 53,915 cars for the period ending December 7, 1910. The total shortage for the same period was 11,901 cars, as against 17,697 cars for the corresponding period in 1911."

The accompanying table gives car surplus and shortage figures

by groups for the last period covered in the report, and the diagrams show total bi-weekly surpluses and shortages in 1907 and 1911.

Foreign Crops.*

The 1911 wheat harvest in the northern hemisphere began in British India in March with a record crop of 372,000,000 bushels, and ended in Canada in October with another record yield of 203,000,000 bushels; in other countries, with the one important exception of Russia, yields as a whole have been satisfactory, and the total crop of the northern hemisphere, though not a record, will probably rank as one of the three largest ever produced.

During October sowing winter wheat and rye was pursued throughout all Europe with exceptional activity, the beginning of the work having been delayed in many of the countries earlier in the season by persistent drought. General rains have since put the soil almost everywhere in excellent condition, and seeding has on the whole been carried on under unusually propitious conditions and is for the most part finished. Although no statistics of acreage are yet available, the favorable seed time tends to indicate that full areas have been sown.

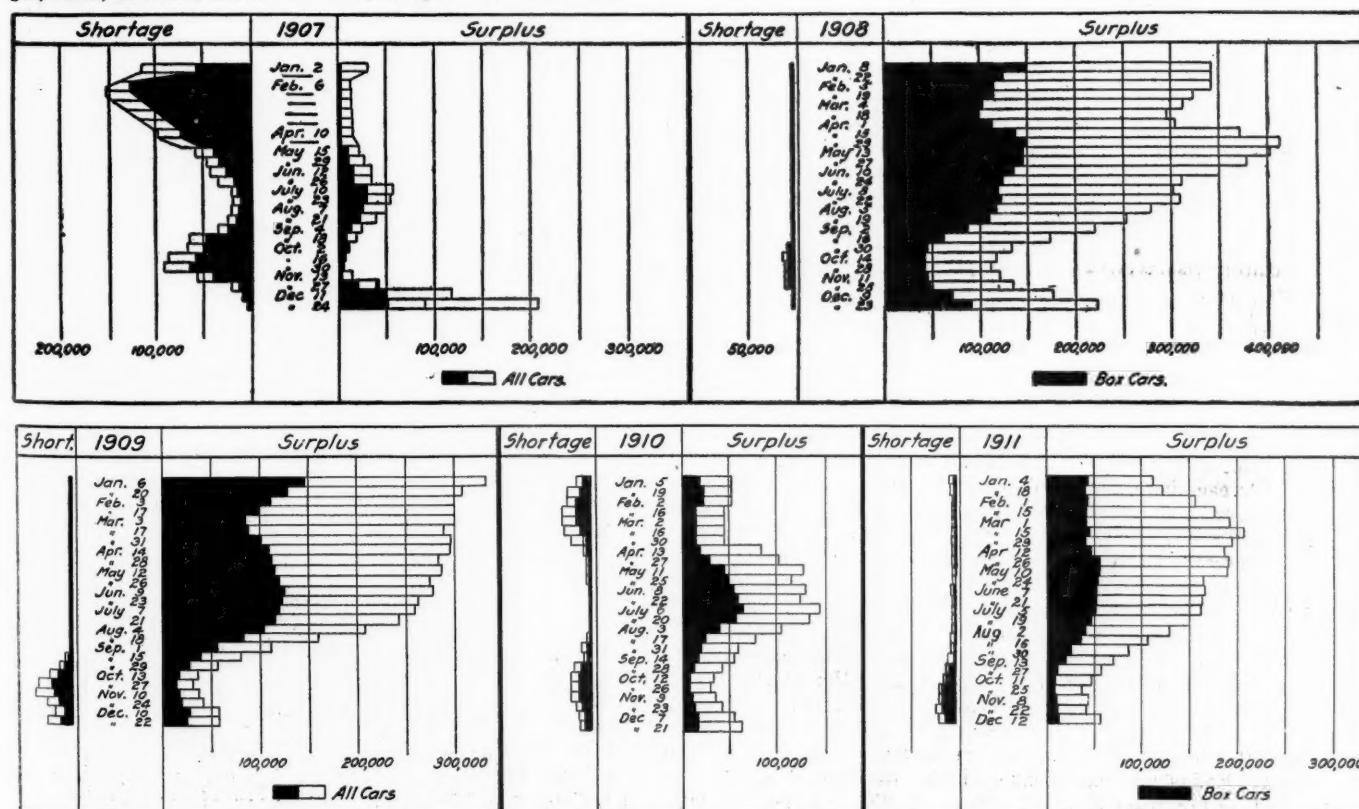
The prospect for the harvest which takes place in the southern

*Circular 25, Bureau of Statistics, U. S. Department of Agriculture.

CAR SURPLUSES AND SHORTAGES.

Date.	No. of roads.	Surpluses					Shortages				
		Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.	Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.
Group *1.—December 6, 1911.....	7	511	1,196	367	263	2,337	370	22	375	135	902
" 2.—" 6, 1911.....	26	1,142	129	3,768	342	5,381	9	0	0	85	94
" 3.—" 6, 1911.....	26	953	972	10,066	2,081	14,072	1,509	7	0	1,227	2,743
" 4.—" 6, 1911.....	11	277	2	319	610	1,208	1,535	102	1,375	5	3,017
" 5.—" 6, 1911.....	20	40	1	109	940	1,090	235	290	715	15	1,235
" 6.—" 6, 1911.....	22	4,499	479	2,211	4,434	11,623	413	4	216	317	950
" 7.—" 6, 1911.....	3	0	61	215	754	1,030	59	0	0	0	59
" 8.—" 6, 1911.....	19	718	359	1,881	2,061	5,019	758	40	126	10	934
" 9.—" 6, 1911.....	10	1,477	133	237	703	2,550	140	0	0	0	140
" 10.—" 6, 1911.....	20	1,414	1,050	1,489	5,116	9,069	1,053	0	6	2	1,061
" 11.—" 6, 1911.....	5	0	230	0	231	461	6,196	72	0	274	6,542
Total	169	11,031	4,612	20,662	17,535	53,840	12,277	537	2,813	2,070	17,697

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland, and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin, Minnesota and the Dakotas lines; Group 7—Montana, Wyoming and Nebraska lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Oregon, Idaho, California and Arizona lines; Group 11—Canadian lines.



Car Surpluses and Shortages in 1907 to 1911.

hemisphere from November to March has been almost universally spoken of in superlatives, the outlook in Australia being perhaps somewhat less favorable than in Argentina. Large areas in both countries, however, have very critical stages of vegetation yet to pass through, as the bulk of their crops is not cut until December and January. The largely increased area under wheat in Argentina and the favorable weather that has thus far attended its growth inspires confidence in a yield largely surpassing the 192,000,000 bushel crop of 1907-8. Weather conditions in Australia have not been altogether favorable, but late rains are believed to have effected great improvement.

CANADA.

In the October issue of the *Census and Statistics Monthly*, the Canadian department of agriculture revises its September estimate of the 1911 production of wheat, barley, and oats, and publishes a preliminary forecast of the yield of rye, flaxseed, and corn. By revision it appears that the total wheat crop of Saskatchewan had been overestimated by about 26,000,000 bushels, the production being 87,180,000 bushels instead of 112,805,000 as estimated in September. In Manitoba, Alberta and Ontario, however, revision adds 24,364,000 bushels to their total, the crop of Manitoba being 1,387,000, of Alberta 19,554,000, and of Ontario 3,433,000 bushels larger than calculated the month previous. In the other provinces there was a reduction of 386,000 bushels. The total wheat production of Canada is therefore now estimated at 202,997,000 bushels, of which 26,479,000 bushels is of the winter and 176,518,000 bushels of the spring variety, whereas a month ago the corresponding figures were 17,706,000 bushels winter and 186,928,000 bushels spring.

The barley crop, according to the revised figures, is the smallest in several years, and amounts to only 43,579,000 bushels, or 7,980,000 bushels less than formerly estimated. Oats has yielded 19,000,000 bushels less than anticipated, the total now being put at 348,774,000 bushels. The corn crop is estimated at 17,159,300 bushels against 18,726,000 bushels in 1910.

ARGENTINA.

The wheat harvest, which begins in the North in November and ends in the South in February, promises to be much larger this season than in any previous year. Throughout the growing period meteorological conditions have been exceptionally auspicious, and the surface sown, as now definitely determined by the Argentine ministry of agriculture, exceeds that of 1910-11 by over 1,500,000 acres, making over 2,500,000 acres increase in the culture of this cereal within the last two years. The 1911-12 flax average constitutes a new record by a small margin. The production of oats is a comparatively new factor in the rural economy of the country, the development of the culture being confined largely to the province of Buenos Ayres. Five years ago the entire area devoted to its cultivation amounted to only 702,000 acres, but lately the industry has become rapidly popularized, and in 1911-12 the acreage sown totaled almost 2,500,000 acres.

AUSTRALIA.

Wheat culture has received great impetus in Australia within the last few years, the area under its cultivation having been augmented by 1,323,800 acres in 1909-10 and by 774,341 acres in 1910-11. As both seasons were favorable, yields largely exceeded all previous ones, amounting to 93,263,000 bushels in 1909-10 and 98,109,000 bushels in 1910-11. The prospect is that these results may not be equaled in the harvest which begins in November. The area in New South Wales is 186,000 acres larger than last year, and although a wet seedtime in Victoria may have contracted the acreage there, increased sowings in other states, it is believed, have made the surface about to be harvested a record. At various times during the growing season the plants in some localities are reported to have suffered from drought, and, on the whole, conditions have been medium and only fair returns are expected.

The production of wheat in New Zealand is officially returned as 8,934,000 bushels in 1909-10 and 8,535,000 bushels in 1910-11, harvested from respective areas of 311,000 and 321,541 acres.

UNITED KINGDOM.

In 1911 about 80 per cent. of the total acreage of Great Britain was under crops, hay and pasture; and in Ireland about 85 per cent.

In the extent of land devoted to its cultivation, oats is the leading crop both in Great Britain and in Ireland. Second in acreage in Great Britain is wheat, but in Ireland second rank is still held by the potato, although the extent of its cultivation has decreased almost 48 per cent. within the last half century. The root crops, turnips and mangold, occupy third place as to area in both Great Britain and Ireland, and barley fourth. A striking feature of the last half century in both British and Irish agriculture has been the great contraction of the surface under wheat and barley and the expansion of that under hay and grass. Low ebb in the decline in wheat culture, however, seems to have been reached seven or eight years ago, the 1,406,000 acres under wheat in the entire kingdom in 1904 having increased to 1,951,099 acres in 1911, while the 1,756,127 acres under barley in 1911 marks the lowest record in years.

The British board of agriculture and fisheries, reporting on crop conditions, October 1, stated that cereal harvest was over except in the extreme north of Scotland. Potatoes were not suited by the September weather. The yield in Great Britain is about 96 per cent. of an average crop. Turnips and swedes have suffered badly from drought; mangolds have done better and bad yields are not nearly so universal, still the crop is generally much below normal. Representing an average yield by 100, appearances on October 1 indicated yields for Great Britain represented by the following percentages: Turnips and swedes, 76; mangolds, 91.

The 1911 hop crop is officially returned as 36,738,576 pounds, compared with 33,899,600 pounds last year and 52,725,232 in 1908.

Fair breadths of wheat have already been sown in various districts throughout England, even as far north as Durham. Since the date of the report, rains have fallen everywhere, allowing seeding to proceed rapidly and greatly improving pastures.

FRANCE.

The practical completion of potato digging, grape gathering and the garnering of autumn fruit marks the close of an agricultural year fairly bounteous in cereal production, but singularly deficient, because of drought, in late cuttings of hay and in the yields of earth grown products, such as potatoes and sugar beets. General soaking rains fell opportunely in late September and throughout October, and millions of acres of ground were broken in the pink of condition, and for the most part seeded for harvest in the summer of 1912. Official estimates of late-maturing crops—potatoes, sugar beets, etc., have not yet appeared.

In 1911 the total quantity of five cereals produced was 79,212,000 bushels larger than in 1910, although the surface under their cultivation in the former year was 418,165 acres smaller; whereas, compared with 1909, the 1911 production was the smaller by 74,892,000 bushels and the acreage less by 473,900 acres.

ITALY.

The preliminary estimate of the Italian ministry of agriculture relative to the wheat, oats, barley and rye crops of 1911 appears to have been oversanguine, particularly with reference to wheat, which a recent revision reduces from 203,374,000 to 192,395,000 bushels. Corn, the second cereal in importance in Italy, covered 21,000 acres less this season than last; the yield of 93,837,000 bushels was smaller than in 1910 by 3,362,000 bushels, the deficiency having been caused partly by drought. Rice is preliminarily estimated to have yielded 1,042,798,000 pounds, 77,227,000 pounds increase over the outturn, as finally estimated, last year.

GERMANY.

Copious rains in late September and early October rendered the drought-hardened soil workable, and the delayed sowing of winter cereals, potato digging, and other autumn work have since been carried on with great activity. The encouraging weather gives rise to the belief that the usual extent of land will be sown to winter rye and wheat. The rains, however, came too late to remedy to any great extent the enormous losses from drought to potatoes, sugar beets and feeding stuffs, though their condition has in some places been ameliorated. In Prussia the preliminary official estimate of a yield of 828,547,000 bushels of potatoes against 1,238,972,000 bushels finally estimated in 1910 is reported increased by upward of 40,000,000 bushels since the drought was broken.

Hop culture in Germany has for some years been steadily declining, the area having fallen off almost 35 per cent. since 1907.

Owing more to meteorological causes, however, than to decreased acreage, the production in 1911 amounted to only 23,430,000 pounds, not quite 53 per cent. of the moderate crop of the preceding year, although over 75 per cent. in excess of the very short yield in 1909.

AUSTRIA.

Yields of the late maturing crops, potatoes, sugar beets and corn, have been greatly diminished as a result of the long drought, excepting in eastern Galicia and Bukowina, where wet weather retarded the maturing of corn, and, while keeping the foliage of potatoes green, caused rot on the heavy low lands; only in the provinces named are sugar beets said to have made good progress, their appearance in the rest of the empire being officially rated poor, or the worst of all crops. Cereal thrashings indicate satisfactory results; rye, the most important cereal, may not have given quite the yield of 1910, but wheat is probably a good average in volume and of excellent quality, while barley and oats both surpass the record of last year.

HUNGARY.

According to the October 17 report of the Hungarian ministry of agriculture, corn, the early varieties of which had been husked, promises a yield of 138,063,000 bushels, as compared with 131,174,000 bushels forecasted last month and an actual yield of 187,731,000 bushels in 1910.

The prospect for potatoes, under the influence of abundant rain in late September and early October, had somewhat improved; the ministry now estimates the output at 159,172,000 bushels; on September 5 the prospect warranted a forecast of only 145,651,000 bushels. The actual yield in 1910 was 176,974,000 bushels.

Autumn seedings have been, for the most part, completed under favorable conditions, the only complaint having been delay in starting, caused by the long drought.

RUSSIA.

Definite and comprehensive knowledge respecting the actual shortage of the 1911 cereal crops will not be obtainable until the publication of the final official estimate on the spring cereals, which will probably appear in December.

The final figures on winter wheat, which ordinarily constitutes about one-fourth of the total crop, were 188,000,000 bushels in 1911, as compared with 248,600,000 bushels in 1910, and on winter rye, which usually represents about 98 per cent. of the entire production, were 745,614,000 in 1911 as compared with 851,143,000 bushels in 1910.

Unofficial reports tend to confirm previous tentative official and unofficial estimates concerning the disastrous effects of the drought in parts of the empire.

The *Board of Trade Journal*, published by the British board of trade, states in the issue of October 12, 1911, that "the Russian head administration of indirect taxation, on the basis of reports from the superintendent of excise, places this year's crop of sugar beets at 12,998,600 tons, as compared with 10,847,740 tons in 1910, and 6,800,000 tons in 1909. The production in 1910 was a record one, and a good proportion of the sugar is still held in Russia by producers and speculators. This year's beet roots contain somewhat less sugar than last year's, but the difference is probably not large enough to bring the output of sugar this season below that of last year."

JAPAN.

The pre-harvest official estimate (August 27) of the production of rice in 1911 is 271,041,000 bushels, as compared with 238,712,000 bushels in 1910, and 268,428,000 bushels in 1909. The indications are that the 1911 crop will be the largest in a decade, and exceed the previous high record crop of 1909 by 2,513,000 bushels. The weather in the month of September, always a critical period for the Japanese rice crop, is reported to have been exceptionally favorable.

CEREAL PRODUCTION FOR 1911 IN THOUSANDS OF BUSHELS.

	Wheat.		Oats.		Barley.	
	1911.	1910.	1911.	1910.	1911.	1910.
Canada	†202,997	.....	†348,774	.....	†43,579	.....
Australia.....	†98,109	†93,263	.....	.....	.....	.....
France	†314,197	†257,667	†304,452	†290,776	†48,812	†43,447
Italy	†192,395	†153,168	†40,973	†28,574	†10,882	†9,483
Roumania	†93,724	†110,761	.....	.....	.....	.....

†Revised estimate.

‡Final estimate.

INTERSTATE COMMERCE COMMISSION.

The commission has reopened the investigation of the matter of substitution of tonnage at transit points (18 I. C. C., 280), and will hold hearings beginning January 29, 1912.

Commissioner Harlan will conduct a hearing on January 24 at Duluth in the case of the Duluth Commercial Club against the railways involving complaints of discrimination in the lake and rail rates from eastern points to Duluth as compared with the rates to Minneapolis and St. Paul and other points.

The commission has formally ordered that all applications for relief under the fourth section filed on or before February 17, 1911, on which the sole ground for asking for relief for a rate made from producing point to consuming point, but not made to intermediate points is that the intermediate points are not producing or consuming points, should be denied.

Reparation Awarded.

George M. Spiegle & Co. et al. v. Southern Railway et al.
Opinion by Commissioner Lane:

In 19 I. C. C., 526, the commission found that the complainant was entitled to reparation, and the complainant and defendants have now agreed on the amount of that reparation. (22 I. C. C., 82.)

Complaints Dismissed.

C. N. Dietz Lumber Co. v. Atchison, Topeka & Santa Fe et al.
Opinion by the commission:

A tariff which limits reconsignment privilege under through rate to the first 48 hours after the arrival of a car at destination, is held to be a not unreasonable limitation. (22 I. C. C., 75.)

Raymond B. Scudder v. Texas & Pacific et al. *Opinion by the commission:*

On a shipment of sugar which required two cars, but which was only sufficient to provide 24,205 lbs. for the second car, a minimum carload weight of 33,000 lbs. was charged for, and this the commission holds to be the proper charge. (22 I. C. C., 60.)

STATE COMMISSIONS.

The North Dakota Railway commission has ordered carriers subject to its jurisdiction to restore their special rates on implements returned for repair, effective March 1, 1912.

The Indiana Railway Commission has ordered the Cleveland, Cincinnati, Chicago & St. Louis to deliver coal in carload lots to the Indianapolis Union for switching to the Terre Haute, Indianapolis & Eastern electric railway for transportation to Plainfield. The steam line is authorized to charge \$2 per car for the service.

The Indiana Railway commission has ordered that the manufacturers' rate of 65 cents per ton be applied on coal delivered to the Kokomo, Marion & Western Traction Company instead of the ordinary rate of 75 cents. The commission held that the traction company is a manufacturer of electric current and is therefore entitled to the lower rate.

The Indiana State Railroad Commission has decided that a railway furnishing cars to shippers, complying with the shipper's request to weigh such cars, may charge for weighing if it does not show the stenciled weight to be more than 500 lbs. out of the way. The Citizens' Gas Company, receiving cars to be loaded with coke complained at having to pay for having them weighed.

The New York State Public Service Commission, first district (New York City), the support of which is borne by the city treasury, has made requisition for \$1,367,000 to defray the expenses of the commission for the year 1912. This is a considerable increase over the sum granted for 1911. The supervision of the construction of new subways, including preliminary work and the preparation of plans, will take 80 per cent. of the sum named.

The suit of the Indiana Railroad Commission against the Grand Trunk, as reported in the *Railway Age Gazette*, December 8, page 1184, was based on the Indiana block signal law of 1907; and although the case will probably be appealed to a higher court for the purpose of settling points of law, the actual relation of this railway to the state of Indiana in the matter of

block signals is not affected, as the recent action of the commission in the premises has been based on the stronger law, passed this present year. Under this law the Grand Trunk requested the commission to extend to January 1, 1913, the time within which compliance with the law would be required; and, the commission having done this, the road has agreed to install by the date mentioned automatic block signals throughout its line in Indiana, a distance of 83 miles.

COURT NEWS.

The supreme court of the United States has sustained the constitutionality of the full-crew law of Indiana.

The supreme court of the United States has sustained the law of Illinois, making cities and counties responsible for damage to property by mobs.

The supreme court of Indiana, in a suit where a train blocked a highway crossing beyond the time allowed by law, thereby preventing fire engines from reaching a burning building, holds that the railway company is liable to the owner of the building for the damage sustained.

On application of the Southern Pacific the federal court at San Francisco has temporarily enjoined the California State Railway Commission from enforcing an order recently issued reducing freight rates between Los Angeles and San Pedro. The Southern Pacific calls attention to the fact that, while the reduction ordered amounts to 30 per cent., the commission has left undisturbed the rates between the same places for similar distances by the lines of other companies.

Oliver Huff, a freight train conductor of the New York, New Haven & Hartford, has secured a verdict in the United States Circuit Court at New York City for \$22,500, in a suit against the road for injuries sustained in a collision of freight trains at Fairfield, Conn., last June. Huff sued under the federal employers' liability law, and the court, Judge Hough, sustained his contention that the fellow-servant rule had been abrogated by the employers' liability law. It was held that the conductor's injuries were caused by the negligence of the engineman or the signalman.

The court of criminal appeals of Texas has sustained the law of that state which provides that the conductor of a railway train shall have had a certain amount of experience as a conductor or two years' experience as a brakeman. The case was that of W. W. Smith of Gregg county, who had been fined \$25 for acting as conductor contrary to law. It appears that Smith had had long experience as a locomotive engineman. This fact was duly recognized by the court, and it was even admitted that the experience of Smith as engineman may have fitted him to act as conductor, within the spirit of the law. But the judge appears to have been a strict constructionist, and so he decided against Smith. The railway company, the Texas & Gulf, will probably have the case appealed.

The demurrers interposed by the defendants in the government's suit brought against the Hamburg-American Packet Company and other transatlantic steamship lines to dissolve the so-called Atlantic Conference as repugnant to the provisions of the Sherman law have been overruled by the United States Circuit Courts. The opinion of the court is written by Judge Noyes, who says that it may be accepted without discussion that the transportation of passengers between this country and Europe forms a part of the commerce of the United States, and also that Congress clearly has the power to prohibit all contracts, combinations and conspiracies in restraint of such part of the foreign commerce of the United States. The real question, says the court, is not one of power but of interpretation, and that question may be divided into two phases; first does the agreement in question directly and materially affect foreign commerce? and, second, does such agreement with the acts stated in the petition amount to an unlawful contract, combination or conspiracy?

Elevator Charges at Omaha.

The decision of the United States Supreme Court in the case of the Union Pacific v. Updike Grain Company et al., handed down December 4, sustains the contention of the elevator men that they should be allowed compensation by the railways for

elevating grain, in spite of the fact that the cars were not promptly returned to the Union Pacific, as required by the rule. The rule is held to be unreasonable. The decision is by Mr. Justice Lamar and contains a brief history of the protracted litigation concerning elevator charges at Omaha and other points on the Mississippi river. In 1899 the Union Pacific made an agreement with Mr. Peavey to build an elevator at Council Bluffs and to pay him 1.5 cents per 100 lbs. for elevating grain; and also made similar contracts with other elevators on its lines controlled by or affiliated with Peavey. The arrangement, with the allowance, was made for the purpose of securing prompt return of Union Pacific cars to the shipping points. Subsequently the road agreed to pay for similar service at elevators not erected immediately adjacent to Union Pacific tracks; but there was a condition that this payment would not be made unless the empty car got back to the Union Pacific in 48 hours. In the cases of Updike and others, it frequently happened that the cars did not get back within 48 hours. This appears to have been due, sometimes, perhaps generally, to the rule allowing the switching road to return a foreign car home by some other route; but the Union Pacific refused to pay for the unloading. The elevator men went to the Interstate Commerce Commission and got a decision in their favor. This was sustained by the court, although the road alleged that the elevators had performed the service in their own interests and not on behalf of the road, or of the public, and also claimed that its own tariff, allowing these charges, was unlawful. The Circuit Court of Appeals sustained the trial court.

Justice Lamar considers the subject under three heads. First, was the claim of the Union Pacific that this elevator service was not strictly a transportation service, and therefore was not chargeable against the carrier. But the law of June 29, 1906, amending the interstate commerce law, made the term "transportation" include elevation and transfer in transit, and all services in connection therewith; required carriers to provide and furnish such "transportation"; and recognized that the shipper himself might own the elevator performing this transportation service. The commission had before that decided that the contract with Peavey was valid, and the act of Congress must be taken as a legislative recognition of the practice of the Union Pacific, and a declaration that the incidental advantage derived by the owner of the elevator was not undue. The commission, in April, 1907, reduced the elevator allowance from 1.5 cents to 0.75 cent, this being held to be the actual cost, and no allowance was made for profit. It prohibited payment for this work to the owner of grain, but the court reversed this part of the decision, holding that Congress had expressly permitted such payment. This disposes of the Union Pacific's contention that its tariff was unlawful.

Secondly, was there a service performed for the carrier? This is answered in the affirmative, the handling of the grain by Updike and others relieving the carrier of the expense of building elevators. By sending the cars to the elevators over switching roads the carrier avoided the delay and expense of transferring the grain from one car to another by shoveling. The carrier received value for which it was bound to pay, and the elevator could not be deprived of its right because, by the operation of rules adopted by the railway companies jointly, the foreign cars were not returned to the Union Pacific.

Thirdly, the Peavey companies had received compensation, because their elevators happened to be located on the Union Pacific, and making a rule which affected the other companies differently was unreasonable discrimination. The road might load all of Peavey's grain into U. P. cars and use foreign cars for all going to the other elevators. The power thus to discriminate would prevent the enforcement of any regulation. To receive the benefit of the service by an elevator without making compensation would in effect be involuntary payment by such elevator of a rebate to the carrier. The rule might be fair on its face, but it was unfair in operation.

It appears that the Union Pacific was able to show that some 200 cars were slow in returning because of failure of the elevator men to promptly unload; and for these the elevator men accepted a ruling by the court that they were not entitled to recover.

Within the next few months an additional 180 miles of the La Plata—Meridiano Quinto Railway, being built by the Argentine government, will be opened to traffic.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

W. G. Wheeler, attorney for Wisconsin of the Chicago & North Western at Milwaukee, Wis., has been appointed assistant general counsel, with office at Chicago. E. M. Smart succeeds Mr. Wheeler.

O. L. Clarke, land and tax commissioner of the Gulf, Colorado & Santa Fe at Galveston, Tex., has had his jurisdiction extended over that portion of the Pecos & Northern Texas between Coleman, Tex., and mile post 461.

Following a reorganization of the Ocean Shore Railroad Company on December 1, S. W. Reynolds, agent for the owners, has been elected president, with office at San Francisco, Cal., and J. W. Crosby, auditor, has been appointed secretary and treasurer.

W. W. Walker, vice-president and general manager of the Duluth, South Shore & Atlantic and the Mineral Range Railroad at Duluth, Minn., has been elected also a director and president of the Mackinac Transportation Company, succeeding W. F. Fitch, resigned.

Edward T. Platt, treasurer of the United States Express Company at New York City, has been elected vice-president and general manager. C. H. Crosby, formerly vice-president and general manager, is now second vice-president, and C. D. Martin has been appointed treasurer.

Francis I. Gowen, general solicitor of the Pennsylvania Railroad at Philadelphia, Pa., has been appointed general counsel, succeeding George V. Massey, who retires on December 31. George S. Patterson, assistant general counsel, has been appointed general solicitor, succeeding Mr. Gowen.

Arch B. Eldredge, who has been elected president and general counsel of the Duluth, South Shore & Atlantic, with office at Marquette, Mich., was born May 12, 1853, at Fond du Lac, Wis. He spent two years at Princeton College and graduated from Racine College, at Racine, Wis., with the A. B. degree in 1875. Mr. Eldredge studied law in the office of his father at Fond du Lac, and went to Ishpeming, Mich., as attorney for the Chicago & North Western in that state in 1882. He was made general attorney of the Duluth, South Shore & Atlantic at Marquette, Mich., in 1890, engaging in the general practice of law at that place, besides taking charge of the legal matters of the road. From May, 1910, until his election as president and general counsel, as above, he was vice-president and general attorney of the Duluth, South Shore & Atlantic, with office at Marquette.

H. J. Horn, assistant to president of the New York, New Haven & Hartford at New Haven, Conn., who will become vice-president in charge of the operating department on January 1, as has been announced in these columns, was graduated from the Massachusetts Institute of Technology, in the civil engineering course, in 1888; prior to graduation he spent three summers in the field on location or construction, and for the first few years after graduation was in various engineering positions, such as assistant engineer on the Chicago Great Western and on the Northern Pacific, part of the time in Montana and Washington, and on the Northern Pacific in Chicago. He entered the operating department of the Northern Pacific in October, 1893, as

superintendent of bridges and buildings of the Minnesota division, and on January 1, 1897, became superintendent of the Montana division. He was appointed general superintendent of the Middle district in November, 1902, at Livingston, Montana, and on February 1, 1903, became general manager of the Northwestern Improvement Company, in charge of the coal department, mining and marketing the coal mined in Montana and Washington. In April, 1904, he became general manager of the Northern Pacific at St. Paul, and left that road in October, 1907. He was then in a commercial and jobbing business until May, 1910, when he became assistant general manager of the Chicago, Burlington & Quincy, west of the Missouri river, with office at Omaha, Neb., and since December 1, 1910, was assistant to the president of the New York, New Haven & Hartford.

Operating Officers.

C. S. Cunningham, acting superintendent of the Grand Trunk at Detroit, Mich., has been appointed superintendent of the Western division, with headquarters at Detroit, Mich.

James B. Gilmer, formerly assistant general manager of the Texas Central at Waco, Tex., has been appointed general superintendent of the Missouri, Oklahoma & Gulf, with office at Muskogee, Okla.

G. A. Berry, chief engineer of the Gulf, Florida & Alabama, now under construction between Pensacola, Fla., and Local, Ala., has been appointed general manager, in charge of operation, with office at Pensacola.

F. R. Westrup, trainmaster of the National Railways of Mexico at Guadalajara, Jal, Mex., has been appointed superintendent, with office at Chihuahua, Chi., Mex., succeeding D. F. Bucher, resigned to accept service with another company.

The following officers of the Gulf, Colorado & Santa Fe have had their jurisdiction extended over that portion of the Pecos & Northern Texas between Coleman, Tex., and mile post 461: J. H. Keefe, assistant general manager; W. E. Maxson, general superintendent; J. Matthews, telegraph manager; K. S. Hull, division superintendent; E. E. Taylor, trainmaster, and A. J. Johnston, chief despatcher.

Henry Baldwin, trainmaster of the Savannah division of the Central of Georgia, at Savannah, Ga., has been appointed transportation inspector and will be assigned to duties in connection with agencies, yards and train service, reporting to G. L. Candler, superintendent of transportation, at Savannah. C. E. Scarboro, chief despatcher succeeds Mr. Baldwin and A. O. MacDonald, track despatcher, succeeds Mr. Scarboro.

Albert Wilcox, whose appointment as general superintendent of the Canadian Northern, with office at Edmonton, Alt., has been announced in these columns, was born January 2, 1865, at Kincardine, Ont., and received a public school education at Owen Sound, Ont. He began railway work in 1881 with the Toronto, Grey & Bruce Railway, now a part of the Canadian Pacific, and became an operator on the latter road at Winnipeg, Man., in September, 1883. For four years he served as operator and agent at various points, was appointed despatcher at Moose Jaw, Sask., in May, 1887, and three years later was promoted to chief despatcher. He left the Canadian Pacific in June, 1903, to become chief despatcher of the Canadian Northern at Port Arthur, Ont., and was promoted to superintendent at the same place in 1904, which latter office he was holding at the time of his appointment as above.

C. A. Searle, assistant to the third vice-president of the Chicago, Rock Island & Pacific at Chicago, has been appointed manager of mail traffic of the Rock Island Lines, effective January 1, succeeding Guy Adams, whose appointment as manager of mail traffic of all Frisco lines has been announced in these columns. Mr. Searle was born at Fairfax, Vt., and began railway work in 1886 in the general office of the Central Vermont Railway at St. Albans, Vt. He was appointed secretary to the freight traffic manager in 1888, and from 1893 to 1895 was chief claim clerk, resigning in the latter year to become chief clerk to the traffic manager of the Baltimore Steam Packet Company at Baltimore, Md. During 1898 he was connected with the Signal Corps of the Navy Department at Washington, D. C., and in December of that year went with the Chicago, Rock Island & Pacific as general excursion agent. In 1902 he was made assistant to John Sebastian, then passenger traffic manager of the Rock Island



A. B. Eldredge.

Lines, and when the latter was promoted to third vice-president in charge of passenger traffic in 1910, Mr. Searle continued as his assistant.

C. H. Baltzell, who has been appointed superintendent of the St. Louis & San Francisco, with office at Thayer, Mo., as has been announced in these columns, was born at Topeka, Ill., on August 24, 1865. He attended school from 1871 to 1880 at Mason City, Ill., and in the latter year began railway work as a messenger on the Chicago & Alton. He was an operator on the same road for three years from 1881 and was then for six years with the St. Louis, Iron Mountain & Southern, having been a despatcher from 1887 to 1890. From 1890 to 1896 he was train despatcher on the Missouri, Kansas & Texas, first at Parsons, Kan., and later at Denison, Tex., and in 1896 returned to the Iron Mountain, where he remained for seven years as train despatcher. He then went with the Chicago, Rock Island & Pacific as train despatcher, was promoted to trainmaster in 1905, and from March, 1907, to September of the same year he was in New Mexico on account of illness. From September, 1907, to December 10, 1911, the date of his recent promotion, he was trainmaster and assistant superintendent of the St. Louis & San Francisco at Thayer, Mo.



C. H. Baltzell.

Traffic Officers.

C. B. Gregory has been appointed general agent of the Colorado Midland, with office at Pittsburgh, Pa., succeeding Frank M. Townsend, deceased.

W. R. Miller, traveling freight agent of the Chesapeake & Ohio at Richmond, Va., has been appointed traveling freight agent, with headquarters at St. Louis, Mo.

N. H. Hall, commercial agent of the Trinity & Brazos Valley at Galveston, Tex., has been appointed foreign freight agent of the Rock Island Lines, with headquarters at Galveston.

R. S. Fife, general eastern agent of the Missouri, Kansas & Texas in charge of freight traffic matters, with office in New York City, has had his jurisdiction extended over passenger traffic matters.

H. E. Frost, soliciting agent of the Norfolk & Western Despatch at St. Louis, Mo., has been appointed commercial agent, with headquarters at St. Joseph, Mo., and L. E. Trowbridge succeeds Mr. Frost.

E. D. Kyle, until recently assistant general freight agent of the Seaboard Air Line at Jacksonville, Fla., is now freight traffic manager, and R. I. Cheatham, assistant general freight agent at Norfolk, Va., is now assistant freight traffic manager, both with offices at Norfolk.

W. C. Connor, Jr., traffic manager of the New Orleans, Texas & Mexico, the Beaumont, Sour Lake & Western and the Orange & North Western, at Houston, Tex., has been appointed general eastern agent of the Frisco Lines, with office in New York City, succeeding S. S. Butler, whose appointment as assistant to the vice-president, in charge of all traffic on the Frisco Lines in Louisiana and Texas, at Houston, has been announced in these columns.

F. E. Sawyer, general freight agent of the Cleveland, Akron & Cincinnati, at Columbus, Ohio, has been appointed assistant general freight agent of the Pennsylvania Lines West, with office at Pittsburgh, Pa. E. F. Austin, traveling freight solicitor at Toledo, Ohio, has been appointed division freight agent of the

Akron division and commercial agent of the Pittsburgh, Cincinnati, Chicago & St. Louis, with office at Columbus, succeeding to the duties of F. E. Sawyer, promoted. J. C. Venning has been appointed ore and coal agent, with office at Pittsburgh, and H. H. Gray has been appointed division freight agent of the Marietta division, with office at Cambridge, Ohio, succeeding H. A. French, deceased.

C. McD. Davis, whose appointment as general freight agent of the Atlantic Coast Line, with office at Savannah, Ga., has been announced in these columns, was born on July 1, 1879, at Hickory, N. C., and was educated in the public schools. He began railway work on March 1, 1893, as a messenger in the freight office of the Wilmington & Weldon, now part of the Atlantic Coast Line, at Wilmington, N. C., and was then made delivery clerk. He held various positions, and was then appointed chief rate clerk of the freight traffic department of the Atlantic Coast Line. He was promoted to chief clerk in the traffic department, of the Atlantic Coast Line in July, 1902, and in January, 1906, was appointed assistant general freight agent in charge of tariff bureau, which position he held at the time of his recent appointment as general freight agent of the lines south of Charleston, S. C.

Robert Norfleet Nash, who has been appointed assistant general freight agent of the Atlantic Coast Line, with office at Wilmington, N. C., as has been announced in these columns, was born on February 26, 1880, at Tarboro, N. C., and was educated in the common schools. He began railway work in September, 1897, with the Atlantic Coast Line as a messenger in the freight office at Wilmington, and the following week was transferred to the general superintendent's office. In October of the following year he entered the freight traffic department as file clerk and held various positions in that department until he was made chief clerk in January, 1910, which position he held at the time of his recent appointment as assistant general freight agent of the same company.

Stewart R. Lewis, whose appointment as general freight agent of the Duluth, South Shore & Atlantic and the Mineral Range Railroad, with office at Duluth, Minn., has been announced in these columns, was born February 14, 1869, in Ontario. He received a high school education and began railway work October 7, 1886, as messenger and stenographer with the Canadian Pacific. Two years later he became a stenographer in the general freight department of the Duluth, South Shore & Atlantic, with which road he has been ever since. From May, 1890, to September 1, 1907, he was rate clerk and chief clerk, on the latter date becoming assistant general freight agent, with office at Duluth, from which position he was promoted on November 30 to general freight agent of the Duluth, South Shore & Atlantic and Mineral Range Railroad.



Stewart R. Lewis.

Robert C. Fyfe, whose appointment as chairman of the Western Classification Committee, with office at Chicago, has been announced in these columns, was born at Kilbourne, Scotland, in 1872. He was educated in the public schools at St. Louis, Mo., and began railway work August 1, 1890, as a mailing clerk in the general freight office of the St. Louis Southwestern at St. Louis. He held various clerical positions with that road until September 16, 1898, when he was appointed chief rate clerk in the general freight department at Tyler, Tex., and in April, 1901, was appointed chief clerk in the same department. He was promoted to assistant general freight agent on December 25 of the same year, and was assistant general passenger agent also

from September, 1905, until January 1, 1908, when he was made a member of the original Uniform Classification Committee. Later in 1908 he returned to the St. Louis Southwestern and again had the title of assistant general freight and passenger agent for a few months. In September of the same year he became a member of the present Committee on Uniform Classification, which position he held at the time of his appointment as above.

J. A. Middleton, freight traffic manager of the St. Louis & San Francisco at St. Louis, Mo., has had his jurisdiction extended over the Chicago & Eastern Illinois, and F. C. Reilly, general freight agent of both roads, has been appointed assistant freight traffic manager, with office at St. Louis. The office of general freight agent at St. Louis has been abolished. B. H. Stange, assistant general freight agent in charge of freight claims of the Chicago & Eastern Illinois at Chicago, has been appointed an assistant general freight agent of the St. Louis & San Francisco at St. Louis, succeeding E. T. Willcox, resigned, and E. S. Stephens, general agent in the freight department of both roads at Chicago, succeeds Mr. Stange. T. O. Jennings, assistant general freight agent of the Chicago & Eastern Illinois at Chicago, has been appointed general freight agent of that road, succeeding Mr. Reilly. J. H. Doughty, commercial agent of both roads at Memphis, Tenn., succeeds Mr. Stephens as general agent in the freight department at Chicago, and R. F. Buchanan, commercial agent at Chattanooga, has been transferred to Memphis, succeeding Mr. Doughty. C. L. Marsh succeeds Mr. Buchanan, effective January 1.

R. N. Collyer, chairman of the Committee on Uniform Classification, effective January 1, has been appointed chairman of the Official Classification Committee, succeeding Frederick S. Holbrook, resigned to become general traffic manager of the Wells, Fargo & Company Express. Mr. Collyer was born October 8, 1866, at Stockton, England, and received a grammar school education at Bayonne, N. J. In August, 1881, he began railway work in New York with the "Bee Line," now part of the Cleveland, Cincinnati, Chicago & St. Louis; and remained in the passenger department of that road until 1886, when he went with the Chicago, Burlington & Quincy as a clerk in the freight traffic department. He was later consecutively, cashier, traveling freight agent and contracting freight agent at New York of the same road, and from 1889 to 1908 was with the Wabash, first as freight agent, then assistant general eastern agent, then division freight agent at Buffalo and subsequently general agent at the same place, and from 1907 assistant general freight agent at St. Louis. He resigned the last mentioned office to become a member of the Committee on Uniform Classification, being one of the representatives of the Official Classification lines, and since June, 1909, has been chairman of the Committee on Uniform Classification.

W. D. Skinner, general freight and passenger agent of the Oregon-Washington Railroad & Navigation Company at Seattle, Wash., has been appointed general freight agent, in charge of rates and tariffs, and his former office has been abolished, his duties in the passenger department being assumed by William McMurray, general passenger agent at Portland. F. W. Robinson, general freight agent at Portland, has been appointed general freight agent in charge of agencies and industrial development. J. R. Stein, chief clerk in the general freight department, has been appointed assistant general freight agent, and A. C. Martin, chief clerk in the general passenger department, has been appointed assistant general passenger agent; all with offices

at Portland, Ore. E. E. Ellis, general agent at Seattle, has been appointed district passenger agent, and F. R. Hanlon, local freight agent at Seattle, has been appointed district freight agent at that place; both to have jurisdiction over Seattle and territory north of Tacoma, Wash. Robert Lee, general agent at Tacoma, has been appointed district passenger agent, and William Carruthers, traveling freight and passenger agent at Tacoma, has been appointed district freight agent at that place; both to have jurisdiction over Tacoma and main line points between Tacoma and Vancouver, Wash. H. P. Potter has been appointed district freight and passenger agent, with office at Aberdeen, Wash., with jurisdiction over the lines west of Centralia, Wash., succeeding J. F. Davidson, transferred.

Engineering and Rolling Stock Officers.

J. F. Sheehan has been appointed master mechanic of the Georgia & Florida, with office at Douglas, Ga.

W. C. Armstrong, terminal engineer of the Chicago & North Western at Chicago, has been appointed engineer of bridges, with office at Chicago, succeeding I. F. Stern, resigned to enter private practice.

John H. Mason has been appointed road foreman of engines of the Lehigh Valley and Susquehanna division of the Central Railroad of New Jersey, with office at Mauch Chunk, Pa., succeeding A. B. Enbody, promoted.

J. W. Small, superintendent of machinery of the Missouri Pacific at St. Louis, Mo., has been appointed superintendent of motive power of the Southern Pacific Lines in Texas, with office at Houston, Tex., succeeding J. J. Ryan, deceased.

R. F. Carley has been appointed chief operating engineer of the Illinois Traction System, with office at Peoria, Ill., succeeding W. H. Thompson, resigned to become general manager of the Des Moines Electric Company at Des Moines, Iowa.

W. W. Scott, formerly superintendent of shops, of the Cincinnati, Hamilton & Dayton at Moorefield, Indianapolis, Ind., has been appointed shop superintendent of the Pere Marquette at Saginaw, Mich., succeeding C. K. Woods, resigned.

The following officers of the Gulf, Colorado & Santa Fe have had their jurisdiction extended over that portion of the Pecos & Northern Texas between Coleman, Tex., and mile post 461: P. T. Dunlop, mechanical superintendent; F. Merritt, chief engineer; Maynard Robinson, master mechanic; S. F. Clapp, general foreman of bridges and buildings; and J. C. Whidden, roadmaster.

H. C. Needham has been appointed master mechanic of the Southwest system of the Pennsylvania Lines West, with office at Richmond, Ind., succeeding J. W. Hopkins, general foreman at that place, and the title of general foreman has been abolished. F. V. McDonnell, master mechanic of the Northwest system at Mahoningtown, Pa., has been appointed master mechanic of the Southwest system, with office at Logansport, Ind., succeeding J. J. Walsh, transferred.

Purchasing Officers.

T. O. Wood, purchasing agent of the Gulf, Colorado & Santa Fe, and E. S. Newton, general storekeeper, both at Cleburne, Tex., have had their jurisdiction extended over that portion of the Pecos & Northern Texas between Coleman, Tex., and mile post 461.

OBITUARY.

D. N. Correll, roadmaster of the Lake Erie & Western, with office at Peru, Ind., died at that place on December 12.

Captain W. P. Wright, formerly and for many years a trainmaster of the Chesapeake & Ohio, died on December 14, at his home in Bedford City, Va., at the age of 76.

F. M. McKeon, traveling freight and passenger agent of the Spokane & Inland Empire, with office at Spokane, Wash., committed suicide by inhaling illuminating gas in a hotel at San Francisco, Cal., on December 11.

J. C. Wood, general agent of the Chicago, Milwaukee & St. Paul, with headquarters at Pittsburgh, Pa., died at that place on December 13. Mr. Wood was born at Madison, Ind., 46



R. N. Collyer.

years ago and spent most of his life in railway work. He was for a time commercial agent of the Chicago, Indiana & Southern at Chicago and later general agent of the Chicago, Milwaukee & Puget Sound at the same place. Since July, 1910, he has been general agent of the C., M. & St. P. at Pittsburgh.

Ralph E. Lawrence, general agent, freight department, of the Wabash Railroad at Pittsburgh, Pa., died at his home in Crafton on December 14. Mr. Lawrence was born in Ohio and began railway work as a telegraph operator on the Cleveland & Pittsburgh at Bridgeport. He was later chief clerk to the general agent of the Cleveland, Lorain & Wheeling, now a part of the Baltimore & Ohio, at Wheeling, W. Va., and then chief clerk to the general agent of the Wheeling & Lake Erie. About three years ago Mr. Lawrence was appointed general agent of the Wabash at Pittsburgh.

James M. Root, who died at his home in New York City this week, at the age of 67, was a hero of the forest fires in Minnesota in the summer of 1894. On August 31, Root was engineer on a passenger train on the St. Paul & Duluth running from Duluth south. The fires had wiped out Hinckley and other towns. Root's train was crowded with passengers. When he was unable to proceed farther he ran the train back seven miles through dense smoke to a small swamp where the passengers escaped the flames by submerging their bodies in the water. Root himself was badly burned and nearly suffocated.

Oswald Morley Laing, general superintendent of the Central New England, died on December 15 of typhoid fever at Hartford, Conn. Mr. Laing was born at London, Ont., on July 28, 1872, and was educated in the public schools and at the Collegiate Institute. He began railway work in 1890 as a clerk in the auditing department of the Chicago, Burlington & Northern, then went to the St. Paul & Duluth. In April, 1898, he went to the Seattle & International Railway as cashier and was also purchasing agent. He afterward was chief clerk to the superintendent of the Seattle division of the Northern Pacific, and in October, 1902, was appointed purchasing agent and general storekeeper of the Tennessee Central. In 1905 he was elected secretary of that company and of the Nashville Terminal Company. Mr. Laing went to the Central New England in 1906 as assistant superintendent and became general superintendent in January, 1909.

FOREIGN RAILWAY NOTES.

The Chilean government has aided the construction of railways by private capital by guaranteeing 5 per cent. bonds to the extent of \$62,847,046, covering four lines.

The Russian council of ministers recently resolved that the Warsaw-Vienna Railway should immediately be taken over by the state, and that a bill to that effect should be introduced into the Duma. The railway is of great strategic importance, and the purchase price is estimated to be about \$16,000,000.

The committee charged with the work of studying the advisability of electrifying the government railway from Valparaiso, Chile, to Santiago, with the branch to Los Andes, covering a distance of about 150 miles, has made a favorable report and placed the cost, if done by the government, at \$10,888,460, while it is reported that an American electric company has offered to do the work for \$5,424,400.

Negotiations are under way to open up a railway and water route through from the northern Chilean ports of Antofagasta and Arica to Viejo, a port in eastern Brazil, where steamers connect with European ports. It is claimed the journey can be made by this route within 20 days. In order to complete this route it is necessary to construct only 149 miles of road to connect Cochabamba, the second city of Bolivia, with Chimore on a branch of the Mamore river.

The London & North Western Railway has made complete arrangements for the collection and delivery of Christmas parcels in all the principal towns on its system, and all parts of Wales, Scotland and Ireland. Special parcel trains will be run and through cars will also be attached to the principal passenger trains, while additional delivery and collection services will be in operation during the Christmas week. The Midland Railway is also organizing special express trains in addition to the through cars which will be attached to long distance express trains.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

THE TEXAS & PACIFIC is said to be preparing specifications for 10 eight-wheel locomotives and 10 consolidation locomotives. This item has not been confirmed.

THE GRAND TRUNK is said to have ordered 25 heavy consolidation locomotives from the Canadian Locomotive Company. This item has not yet been confirmed.

THE CHICAGO & NORTH WESTERN has ordered 15 switching locomotives, 15 passenger locomotives and 45 freight locomotives from the American Locomotive Company.

THE DELAWARE & HUDSON has ordered 3 Mallet locomotives from the American Locomotive Company, and will soon order 10 or 12 more locomotives, but it has not yet been decided whether they will be Mallet locomotives or heavy consolidation locomotives.

THE PACIFIC MILLS, Lawrence, Mass., have ordered 1 four-wheel locomotive from the American Locomotive Company. The dimensions of the cylinders will be 17 in. x 24 in., the diameter of the driving wheels will be 46 in., and the total weight in working order will be 102,000 lbs.

THE CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA has ordered 5 six-wheel switching locomotives from the American Locomotive Company. The dimensions of the cylinders will be 18 in. x 24 in., the diameter of the driving wheels will be 51 in., and the total weight in working order will be 130,000 lbs.

CAR BUILDING.

THE GREAT NORTHERN is making inquiries on 40 refrigerator cars.

THE CANADIAN PACIFIC is asking for bids on 200 refrigerator cars.

THE LEHIGH VALLEY is in the market for 250 twenty-five-ton refrigerator cars.

THE ELGIN, JOLIET & EASTERN is figuring on 500 dump cars and 250 gondola cars.

THE ATLANTA, BIRMINGHAM & ATLANTIC is building 20 stock cars at the company's shops.

THE ROCK ISLAND LINES are figuring on about 3,000 freight cars and some passenger cars.

THE ILLINOIS CENTRAL has ordered 500 box cars from the American Car & Foundry Company for the Central of Georgia.

THE CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA has ordered 500 box cars and 100 refrigerator cars from the American Car & Foundry Company.

THE ATLANTA & WEST POINT is making arrangements to build 100 thirty-ton box cars and 10 forty-ton automobile cars at the company's shops.

THE CHICAGO & NORTH WESTERN, mentioned in the *Railway Age Gazette* of December 8, as having ordered 1,250 box cars from the Pullman Company, has increased the order to 1,750.

THE PENNSYLVANIA RAILROAD, mentioned in the *Railway Age Gazette* of December 8 as being in the market for from 3,000 to 6,000 freight cars, is now in the market for from 1,000 to 2,000 fifty-ton all-steel, coke cars, 1,000 to 2,000 seventy-ton, all-steel, gondola cars, 1,000 to 2,000 seventy-ton, all steel, hopper cars and 1,000 to 2,000 seventy-ton, all-steel, coke cars.

IRON AND STEEL.

THE BOSTON & MAINE is in the market for 200 tons of bridge material.

THE CHICAGO & NORTH WESTERN has ordered 60,000 tons of rails from the Illinois Steel Company.

GENERAL CONDITIONS IN STEEL.—There has been a lull in the steel industry during the past few days, owing to the postpone-

ment of large orders until after the holidays. Steel manufacturers are optimistic about the outlook. A large increase in production is expected immediately after the first of the year; and idle furnaces are now being placed in readiness for blowing in. Although no statement has been issued from the offices of the Steel Corporation bearing on the results of the meeting of the presidents of the subsidiary companies held on December 19, it is believed that prices will be advanced about \$1 a ton on standard products.

SIGNALING.

W. W. Finley, president of the Southern Railway, announces that automatic block signals are being installed on that company's line between Monroe, Va., and Montview, 12 miles; and that work will at once be begun on a similar installation between Denim and Charlotte, N. C., 96 miles.

The Chicago, St. Paul, Minneapolis & Omaha is installing automatic block signals on its line between Merrillan and Wyville, Wis., 40 miles. This line is double-track, and the signals are three-position. In connection with this work an all-electric interlocking plant is being installed at the gauntlet on the bridge over Black river.

The Pittsburg & Lake Erie is to install automatic block signals on its line between Dickerson Run and Connellsville, Pa.; and also between Roscoe and East California. The aggregate length of road is nine miles. The signals will be two-position, lower quadrant. The interlocking to be done by this company in the immediate future includes one all-electric plant of 88 levers and five mechanical plants of 72 levers.

The Central of Georgia contemplates the installation of automatic block signals within the next year on its line between Atlanta, Ga., and East Point, five miles, double-track. This line is now worked by the telegraph block system. The signaling plans for the ensuing year include also three new interlocking plants (mechanical) to be operated jointly with the Southern Railway, as follows: Griffin, Ga., 64 levers; Silver Creek, 24 levers; and East-Rome, 40 levers. In all of these plants the distant signals will be power operated.

The Erie Railroad is to install automatic block signals on about 40 miles of its line, as follows: On the Northern of New Jersey from Bergen to Nyack, 24 miles double-track and 3 miles single track; on the New Jersey & New York from Oradell to Spring Valley, 13.5 miles, single track. These signals will be put up by the company's forces, the material being furnished by the Union Switch & Signal Company. The signals will be three-position, upper quadrant. The Erie has also given a contract to the Union Switch & Signal Company to erect mechanical interlocking plants at Polk and Burbank, Ohio, and to the General Railway Signal Company for mechanical interlocking at Madison and Ontario, Ohio. An interlocking plant is also to be put up at South Akron, Ohio, and the plant at Corning, N. Y., is to be enlarged from 40 levers to 60.

The Boston & Albany will instal automatic block signals on 40 miles of track in the near future. This work will involve the replacement of exposed disk and electro-gas signals with three-position upper quadrant semaphores between Springfield and Westfield, and Worcester and Charlton. Two interlocking plants are to be built and two plants rebuilt. A 32-lever mechanical plant will be installed at Brookline Junction; and the mechanical machine at Newton Highlands is to be replaced by a new 16-lever machine. Tower No. 31 at Webster Junction, Mass., is to have a new machine of 36 levers; and tower No. 55, at North Adams Junction, will be reconstructed to accommodate a machine of 76 levers. An 80-lever electrical plant, controlling a station cross-over layout, and a 60-lever mechanical plant, governing a yard entrance, are to be installed at Worcester. The interlocking signals are to be upper quadrant. All of the mechanical interlocking plants are to be equipped with electric approach and route locking, and both home and distant signals at these plants will be power operated.

The Uruguayan concession, given to Caprario & Company, and sold to a German syndicate, for a railway from the port of La Paloma to Treinta y Tres has been cancelled, owing to the failure of the concessionaires to fulfill the conditions.

Supply Trade News.

The McKeen Motor Car Company, Omaha, Neb., has recently shipped two 70-ft., 200-h. p. gasoline motor cars to the Victorian Railways, Melbourne, Australia. The shipment required five flat cars for transportation to Tacoma, where it will be shipped via the Frank Waterhouse line. The two boxes containing the car bodies were 70 ft. long, 11 ft. wide and 10 ft. high. They are said to be the largest boxes ever shipped in the history of rail or water transportation. The cars are adapted to the Victorian Railways, which have a 5-ft. 3-in. gage.

J. Will Johnson, sales agent of the Pyle National Electric Headlight Company, Chicago, will be appointed general manager January 1, in charge of the sales department, with supervision

of traveling representatives. Crawford P. McGinnis, air brake inspector Minneapolis, St. Paul & Sault Ste. Marie, and Robert L. Kilker, brother of general superintendent John E. Kilker, were appointed representatives. Mr. Johnson was born in Charleston, S. C., September 10, 1869. He started in January, 1886, in the freight department of the St. Louis & San Francisco, Pierce City, Mo., and was brakeman for one and a half years and fireman for two and a half years. In June, 1890, he was made locomotive engineer on the St. Louis & San Francisco, at Springfield, Mo. September 1,



J. W. Johnson.

1902, he entered the mechanical department of the Pyle company. In February, 1904, he was appointed special representative, and in September, 1908, he was appointed sales agent.

A Permanent Exhibit of Railway Supplies.

S. Karpen & Brothers, the owners of the new Karpen building, Chicago, have announced that plans have been perfected for a permanent exhibition of railway supplies, to occupy the entire twelfth floor of the Karpen building. It is proposed to make the exhibition a central headquarters for the display of appliances, used in railway operations, where railway officers may examine samples or models of new devices or improvements.

The floor contains 36,000 sq. ft. of space, of which 26,000 sq. ft., exclusive of aisles, will be devoted to exhibit booths. The space has been divided into 134 booths, and the size of allotments will be arranged in accordance with the requirements of exhibitors. Over 60 applications for space have already been received, enough to ensure the execution of the project, and it is expected that several booths will be in readiness for exhibition immediately.

The entire floor is to be free of partitions and is well lighted. In addition to the exhibit booths the plan of arrangement includes a secretary's office, a large meeting or directors' room, several smaller committee rooms and a large assembly hall seating 250 persons. This hall will be placed at the disposal of both railway and supply men's organizations for meetings free of charge.

Booth spaces are to be separated by bronze railings and the management will provide each booth with a desk, chairs, and a table, all of mahogany, also a telephone and electric light. Electricity, steam or water for the operation of models or machinery will also be provided.

It is the purpose of the management to exercise care in regard to the character of the exhibits admitted, and each visitor will be required to register. It is believed that the establishment of the permanent exhibition will fulfill an important function, enabling a railway man to inspect in a single visit the principal devices and appliances in which he is interested without the necessity of traveling to several different plants.

Railway Construction.

New Incorporations, Surveys, Etc.

ALBERTA ROADS.—Prime Minister Sifton recommends that provision should be made at the present session of the provincial legislature for building lines in Alberta as follows: From Edmonton northwest to the Grande Prairie country. From Athabasca Landing to Peace River Landing. From Athabasca Landing to a point near Fort McMurray, with a branch to Lac la Biche. From Edmonton along the north shore of the Saskatchewan river east to Cold lake, at the eastern boundary of the province. Continuation of the line from Peace river to Edmonton in a southeasterly direction along the Strathcona-Camrose extension to the easterly boundary of the province to meet the Regina and Winnipeg lines. This will afford a short line passing through the three capitals and from Edmonton on to Grande Prairie. From Strathcona southerly to the Goose lake line to Calgary. From a point on the Stetler-Brazeau line to meet the Goose lake extension being built to Calgary. From Bruderheim on the Canadian Northern southerly between ranges 5 and 6, through to the southern boundary of the province.

ATCHISON, TOPEKA & SANTA FE.—A four-mile branch will be built, it is said, from the mouth of the San Luis Rey river, Cal., near Oceanside into the San Luis valley. H. C. Phillips, chief engineer, Los Angeles, Cal.

CANADIAN NORTHERN.—Vice-president D. B. Hanna is quoted as saying that the line from Montreal, Que., to the Pacific coast will be completed by January 1, 1914. Construction work is progressing rapidly on the surveyed sections between Montreal and Port Arthur, Ont., and between a point on the western boundary of Alberta to the Pacific coast. Final plans regarding the construction of terminals at Montreal will be announced early next year, or as soon as all questions regarding the transfer of lands had been adjusted.

CANADIAN PACIFIC.—An officer writes that work is now under way on the south Ontario Pacific from Guelph Junction, Ont., to Hamilton, 16.3 miles. J. G. Sullivan, chief engineer, Winnipeg, Man.

CHARLOTTE HARBOR & NORTHERN.—An officer writes that work is now under way from Cottman station, Fla., to Tiger Bay, nine miles. Stidham & Hughes, Limestone, are the contractors. G. S. Bruce, chief engineer, Boca Grande.

CRYSTAL CITY & UVALDE.—An officer writes that surveys have been made for an extension from San Antonio, Tex., to Live Oak, 80 miles. E. Breaker, chief engineer, Crystal City, Tex.

ELK & LITTLE KANAWHA.—An officer writes that this company has completed track laying from Boggs, W. Va., west, thence north to Rosedale. J. J. Boxley & Son, Roanoke, Va., were the contractors. C. P. Peyton, chief engineer, Charleston, W. Va.

FREDERICK RAILROAD.—An officer writes that this company has projected an extension from Jefferson, Md., to Bonnsmith, eight miles. O. B. Cobleintz, chief engineer, Frederick, Md.

GRAND TRUNK PACIFIC.—An officer writes that this company now has 1,176 miles of line under construction and 627 miles under survey. B. B. Kelliher, chief engineer, Winnipeg, Man.

GREAT NORTHERN.—This company has reached an agreement with the state authorities of Washington over the right of way for the extension of the Great Northern north of Wenatchee. The company agrees to begin work on the construction of the branch within six months. The extension from Wenatchee will eventually extend to a point near the Canadian border, where it will connect with another branch of the Great Northern that goes into Canada. Construction work on the extension of the Oregon Electric, a Hill subsidiary, from Salem, Ore., south to Albany, is under way and grading and bridging is expected to be completed by the first of the year. Eventually the line will be built through Eugene. The electric system centers at Portland.

GULFPORT & WESTERN.—Incorporated in Mississippi with \$10,000 capital to build from Gulfport, Miss., to Covington, La. Judge W. H. Hardy, Gulfport, Miss., P. A. Dolan, B. G. Bowen and G. P. Hewes are said to be interested.

HA HA BAY RAILWAY.—An officer writes that the Roberval-Saguenay Railway is to be built from Mathias Junction, Chicoutimi, Que., to Roberval, Lake St. John, 125 miles. J. F. Grenon, chief engineer, Chicoutimi, Que.

ILLINOIS TRACTION SYSTEM.—Announcement has been made that work on the northern extension from Morris, Ill., northeast to Joliet, 22 miles, has been completed, and it is understood that an extension will be built from Mackinaw southwest to La Salle, about 60 miles, next year. L. B. Martin, engineer maintenance way, Peoria, Ill.

KITTITAS RAILWAY & POWER COMPANY.—This company, with headquarters at Roslyn, Wash., is having surveys made by Brown Brothers, Seattle, for an interurban line from Roslyn into the Cle Elum mining district, about 40 miles. The plans include a hydro-electric power plant.

MONTREAL & SOUTHERN COUNTIES (Electric).—An officer writes that this company has built 1.25 miles during 1911 in the province of Quebec from St. Lambert to County Club and has projected an extension from St. Lambert to Chambley, 14 miles. A. S. Going, chief engineer, Montreal.

NATIONAL RAILWAYS OF MEXICO.—An officer writes that work has been finished changing the gage on 102 miles between Acambaro, Michoacan and Patzcuaro. Also relocating 38 miles between Acambaro and Uruapan. In addition work is now under way on the following lines: From K. 20 San Andres branch to San Andres, V. C., 33 miles; K. 20 Cerro Colorado branch to Cosomaloapan, V. C., 13 miles; from Penjamo, to Ajuno, Michoacan, 85 miles; between Durango, Durango, and Llano Grande, 60 miles; between Durango and Canitas, Zacatecas, 167 miles, and from Sombrete, Zacatecas, to Sombrete Junction, six miles. The banking house of Fomento & Bienes Raices, S. A., Mexico City, are carrying out the work. James M. Reid, chief engineer, Mexico Mex.

NEW IBERIA, LAFAYETTE & NORTHEASTERN.—Organized in Louisiana with \$1,000,000 capital, and headquarters at New Iberia. The plans call for building from New Iberia, La., through St. Martinsville, Lafayette and Church Point to Eunice. F. M. Welch, president, H. Barousse, vice-president, Church Point; J. W. Lyons, vice-president, and E. I. Estorege, secretary and treasurer. J. P. Colombe, Lafayette, Dr. J. R. Olivier, St. Martinsville, and J. Drayfus, New Iberia, are directors.

NEW YORK, NEW HAVEN & HARTFORD.—President Mellen in a proposition which he has presented to the city of Springfield, Mass., regarding elevation of tracks in that city, includes a proposition for the construction of a new line from Shaker Station, Conn., to Pecowsic, Mass., about five miles, for the purpose of connecting the line which enters Springfield on the east side of the city with the main line. With the building of this connection a part of the east side line would be sold to the Springfield Street Railway Company. The main feature of the plan now presented to the city is the elevation of the present main line through the thickly settled part of the city, on its present location.

NEW YORK SUBWAYS.—Bids for the construction of section 3 of the Lexington avenue subway, in the borough of Manhattan, will be opened January 11. Section 3 lies between Howard street on the south and Bleecker street on the north, under Broadway. This is the first section of the lower end of the Lexington avenue subway on which the commission had taken action since the revised plans were adopted. In October, 1910, the section now to be re-advertised under the revised plan was bid for by the Bradley Construction Company at \$3,619,315; McArthur Brothers Company, \$3,802,444, and Frederick L. Cranford, \$3,978,901.

OKLAHOMA & NORTHWESTERN.—Final surveys are said to be made from Woodward, Okla., southeast to Watonga, 74 miles. The survey follows the North Fork, Canadian river. A bridge is to be built near Eagle City. E. A. Wagner, president.

OREGON EASTERN.—See Southern Pacific.

OREGON ELECTRIC.—See Great Northern.

PERRY COUNTY & INTERURBAN.—Incorporated in Illinois, with office at Springfield. The plans call for building a line in Perry county, via Pinckney and Dequoin. The incorporators include

G. W. McIntyre, F. A. Spitznagel, Jr., Springfield; I. Black, Duluth, Minn.; A. C. Sprague, Dubois, Ill., and W. Roessler, St. Paul, Minn.

PITTSBURGH & LAKE ERIE.—An officer writes that work is now under way from Arnold, Pa., on the Downer Run branch, to Lynn, on the Elwell Run branch, 4.35 miles, and from Fayette City to Warner at the Youghiogeny Coal Company tippie, 1.75 miles. The Robert Hill Construction Company, Connellsville, Pa., and the railway company's forces are carrying out the work. J. A. Atwood, chief engineer, Pittsburgh.

PITTSBURG RAILWAY.—Organized in California with \$120,000 capital to build from Somerville, Sonoma county, Cal., to Pittsburg Landing, six miles. The directors are C. F. Allen, A. J. Frey, A. M. Garland, R. C. Thompson and W. N. Nelson; all of San Francisco.

ROBERVAL-SAGUENAY.—See Ha Ha Bay Railway.

SOUTHERN RAILWAY.—This company will ask for bids at once to build a belt line at High Point, N. C., connecting the main line with the Asheboro branch. This project has been under consideration for several years and negotiations for the right-of-way, in progress for some time, have just been concluded. The new line will be about two miles long and will leave the main line at a point opposite the Pickett cotton mills, and is to be built in a generally easterly direction to the Asheboro branch. W. H. Wells, chief engineer construction, Washington, D. C.

SOUTHERN PACIFIC.—Supplementary articles of incorporation of the Oregon Eastern, providing for the Harriman east and west line across central Oregon have been filed in Oregon. The plans provide for a line from Natron, in western Oregon, to Ontario on the eastern border, both cities are about midway between the north and south borders of the state. The capital stock of the company is increased from \$100,000 to \$6,000,000. Provision is also made in the supplementary articles for the line in western Oregon to run from Natron on the present Southern Pacific line south to Klamath Falls, in southwestern Oregon, and thence south to a connection with the Central Pacific at Weed, Cal. This latter is the cut-off that has been under construction for some time to give Southern Pacific's line from Portland to San Francisco a shorter and much easier route around the Cascade range. Another branch contemplated is a line from Klamath Falls, Ore., which is half way across the northern California border, east to Lakeview, Ore., just above the northeastern corner of California. From Lakeview connection will ultimately be south to the Central Pacific near Reno, Nev.

SUPERIOR & SOUTHEASTERN.—An officer writes that work is now under way from Taylor Lake, Wis., to Hunters Park, three miles. An extension is projected from Hunters Park to Meed Lake, nine miles. G. C. Clover, vice-president, New Richmond.

TEMISKAMING & NORTHERN ONTARIO.—An officer writes that surveys are being made for an extension of the main line to Elk Lake, Ont., 30 miles. S. B. Clement, chief engineer and superintendent maintenance, North Bay.

UTAH AND GRAND CANYON.—An officer writes that the plans call for building about 500 miles of railway. The first division is to be built from Lund, Utah, to St. George. Rights-of-way have been secured from Lund to a point beyond Cedar City. The plans call for construction work from Lund to Cedar City during 1911, and perhaps beyond that point. The contract will probably be given to J. G. White & Co. F. A. Dudley, president, Niagara Falls, N. Y.

VIRGINIA & KENTUCKY.—An officer writes that this company has projected an extension from Wise, Va., to the Virginia-Kentucky state line, 41 miles. N. P. Bigelow, vice-president, Chicago, Ill.

WICHITA FALLS ROUTE.—An officer writes that work is now under way between Canadian river, Okla., and Woodward, on 38 miles, and between Supply and Forgan, 70 miles. The grading work is being carried out by local contractors, and the track laying and bridge work is being carried out by the company's men. M. M. Cooke, chief engineer, Wichita Falls, Tex.

RAILWAY STRUCTURES.

BUFFALO, N. Y.—The Delaware, Lackawanna & Western has reached an agreement with the city authorities, and expects to

carry out plans made some time ago for track elevation, and enlarging the terminal facilities.

CALWA, CAL.—The Atchison, Topeka & Santa Fe has given a contract to the Sharp & Fellows Contracting Company, Los Angeles, Cal., for constructing reinforced concrete roundhouses at Calwa and at Riverbank. The roundhouses are to have 15 stalls and will be so arranged that in future the capacity can be increased to 45 stalls.

CENTRALIA, WASH.—The contract has been let for a new union station for the Northern Pacific, Great Northern and Oregon-Washington Railway & Navigation Company.

CHICAGO, ILL.—Work has been started on the wrecking of buildings in the vicinity of West Twelfth and South Canal streets on the sight of the new freight terminal to be built by the Central Terminal Railway for the Minneapolis, St. Paul & Sault Ste. Marie.

CHIHUAHUA, MEX.—The Mexico & North Western is installing new shops and proposes to erect a new roundhouse.

JOHNSTOWN, PA.—The Baltimore & Ohio Railroad has given a contract to P. Farrell, Cincinnati, O., for the construction of a new freight house at Johnstown, Pa., on which work will be started at once. The improvement will cost about \$25,000. The building will be 28 ft. x 300 ft., with covered platform at one end 14 ft. x 200 ft., and there will be a two-story brick office building, 28 ft. x 45 ft., with cellar.

LACOLLE, QUE.—The Grand Trunk has let the contract for the substructure of a new bridge to replace the present bridge across the Richelieu river near Lacolle Junction.

MEMPHIS, TENN.—The Chicago, Rock Island & Pacific has bought land for a new freight terminal, including freight houses and extensive yards at South Memphis, but has thus far made no plans for actual construction.

NILES, CAL.—It is reported that the Southern Pacific is planning to build a \$50,000 bridge near Niles.

OMAHA, NEB.—The Chicago, Rock Island & Pacific has officially announced its intention of spending about \$1,000,000 in improvements including the erection of a new freight terminal, freight houses and team tracks on property bought recently, consisting of a tract of 15 acres near the heart of the business district. The razing of the buildings now occupying the site is to be begun shortly after January 1. The Rock Island has heretofore used the Union Pacific terminals in Omaha.

PENSACOLA, FLA.—An officer of the Louisville & Nashville writes that if the company is successful in having certain ordinances enacted, closing streets, etc., it intends to construct a passenger station in the city of Pensacola. The building will be of brick construction, two stories high with waiting rooms, etc., on the first floor, and offices on the second floor. It is to be built at the corner of Wright and Alcaniz streets. The plans have not yet been completed.

RIVERBANK, CAL.—See Calwa, Cal.

SUPERIOR, WIS.—The Minneapolis, St. Paul & Sault Ste. Marie has awarded the contract for a 600-ft. addition to the ore dock on St. Louis bay. The extension will double the capacity of the present dock.

Although the Swedish state railways are those mostly heard of, two-thirds of the total railway mileage of Sweden, which amounts to 8,000 miles, are operated by private companies, there being no less than 300 lines of various gages operated by 75 different companies. Of the total mileage, more than 30 per cent. is narrow gage. Sweden is a sparsely populated country, and therefore the proportion of railway mileage to inhabitants is the highest in Europe, namely, 16 miles per 10,000 people. The Swedish railway system joins the Norwegian system at various points and is connected with the Danish system by means of steam vessels between Malmo, Sweden, and Copenhagen, Denmark, and also between Helsingborg, Sweden, and Elsinore, Denmark. The private lines carry about 32,000,000 passengers a year, about twice as many as the state lines. The freight tonnage is also in about the same proportion.

Railway Financial News.

CINCINNATI, HAMILTON & DAYTON.—The New York Public Service Commission, Second district, has been asked by the company to permit the raising of a loan by the Cincinnati, Hamilton & Dayton, to be secured by \$1,520,000 collateral trust bonds of the C. H. & D. Of the money needed, \$300,000 is to help meet interest charges, and the remainder is for additions and betterments.

CONNECTICUT RIVER RAILWAY.—See Vermont Valley.

BOSTON & MAINE.—This company has finally come to an agreement with the stockholders of the Suncock Valley for a renewal of the lease which expires January 1, and under which the B. & M. had been paying 6 per cent. on the stock of the Suncock Valley. The new lease, which is for two years, provides for the payment of 3 per cent. on this stock.

ERIE.—James H. Oliphant & Co., New York, have issued a carefully prepared pamphlet containing a study of Erie bonds as investments. Besides an analysis of the Erie's operating figures and future prospects for traffic and earning power, there are a set of tables showing capital expenditures, equipment trust issues, appropriations for additions and betterments, etc., over a series of years beginning with 1900.

FITCHBURG RAILROAD.—This company has asked the New York Public Service Commission, Second district, for permission to issue \$1,200,000 bonds to reimburse the Boston & Maine for additions and improvements, including the electrification of the Hoosic tunnel.

GULF, FLORIDA & ALABAMA.—W. W. Jennings, F. B. Irwin and T. A. Jennings have been elected additional directors.

IOWA CENTRAL.—A circular signed by Newman Erb, president of the Iowa Central, and Edwin Hawley, chairman of the board of the Minneapolis & St. Louis, gives the final details of the merger of these two properties. The Iowa Central pays the Minneapolis & St. Louis \$2,500,000, and receives \$1,917,500 M. & St. L. preferred, \$9,370,200 M. & St. L. common and \$2,500,000 refunding and extension mortgage bonds. The securities received by the Iowa Central are distributed to its stockholders as follows: One share of preferred stock and nine shares of M. & St. L. common will be given for each ten shares of Iowa Central preferred, and one share of M. & St. L. common will be given for two shares of Iowa Central common. The circular says in part: "The Iowa Central has considerable value as a feeder to the Minneapolis road, and logically should be a part of a through line from the Missouri river to the Canadian border. While the records of the two companies show that without the tonnage concentrated on its lines from the Minneapolis company the Iowa Central would be unable to properly sustain itself, its value to the Minneapolis road as a link in the connection which it is contemplated will be made with railways at the Canadian border makes it desirable that they should be united."

Stockholders of the Iowa Central have approved the merger.

INTERNATIONAL & GREAT NORTHERN.—Frank J. Gould, chairman of the board, is quoted as saying that interest due February 1 on the \$11,000,000 notes of the company is already deposited with banks in New York.

MINNEAPOLIS & ST. LOUIS.—See Iowa Central.

NEW YORK CENTRAL & HUDSON RIVER.—The New York Public Service Commission, Second district, has authorized the issue of \$15,000,000 New York Central Lines equipment trust 4½ per cent. notes, payable \$1,000,000 annually beginning January 1, 1913. The notes are to be sold at not less than 97.

At the hearing before the New York Public Service Commission, Second district, there was no opposition to the purchase of the New York & Harlem stock by the N. Y. C., but there was opposition by representatives of the minority stockholders of the New York, Ontario & Western to the purchase of that company's majority stock by the N. Y. C.

The New York Public Service Commission has been asked to authorize \$35,000,000 4 per cent. 30-year debentures, to be

sold at not less than 90, and \$30,000,000 4½ per cent. 3-year notes, to be sold at not less than 98½. The notes are to be used only if the debentures cannot be disposed of to advantage, and at no time are there to be more than \$35,000,000 outstanding debentures and notes.

NORTHERN & TOMBIGBEE VALLEY.—This company has bought the Vradenburgh railway, 20 miles long, that is operating in Choctaw and Marengo counties in Alabama.

OCEAN SHORE RAILROAD.—A new corporation has been formed to take over this property, and has issued \$5,000,000 stock to be exchanged for the securities of the old company, and in addition \$700,000 6 per cent. bonds are to be sold, it is understood, to pay off floating indebtedness and to provide working capital.

PECOS VALLEY SOUTHERN.—A press despatch from Alpine, Tex., says that the Pecos Valley Southern has been, or is to be, bought by the Southern Pacific. The road runs from Pecos, Tex., to Balmorhea, 36 miles.

SOUTHERN RAILWAY.—The company has sold to Drexel & Co., Philadelphia, \$1,500,000 4½ per cent. equipment trust certificates.

SUNCOCK VALLEY.—See Boston & Maine.

TOLEDO, ST. LOUIS & WESTERN.—This company has passed, it is understood, the quarterly dividend of 1 per cent. usually declared in December. Heretofore the annual dividend rate has been 4 per cent.

VANDALIA.—A quarterly dividend of ¾ of 1 per cent. has been declared on the \$14,649,000 outstanding stock. The Pennsylvania owns \$11,633,400 of this stock.

VERMONT VALLEY.—The Connecticut River Railway has asked the Massachusetts legislature for authority to merge with the Vermont Valley.

WABASH.—Judge Adams, of the United States Circuit Court at St. Louis, has appointed F. A. Delano, president of the Wabash; E. B. Pryor, vice-president of the Wabash, and William K. Bixby, chairman of the board of directors of the American Car & Foundry Co., receivers of the Wabash. The receivership was in answer to a petition filed by the Westinghouse Air Brake Company for a claim for \$18,000. A committee consisting of Robert Goelet, Edwin Hawley, Thomas H. Hubbard, Alvin W. Krech, Robert Fleming, with Winslow S. Pierce as chairman and H. R. Winthrop, secretary, has been formed to protect the interests of the first refunding and extension mortgage bonds, and asks the deposit of these bonds with the Equitable Trust Co., New York.

A committee consisting of J. Horace Harding, chairman; Franklin Q. Brown, Charles H. Keep, Frank B. Keech, Philip Lehman, Frank K. Sturgis, with Pemberton Berman, secretary, has been formed to protect the interests of preferred and common stockholders, and asks the deposit of stock with the Knickerbocker Trust Co., New York.

A second committee to represent the first refunding 4 per cent. bonds, consisting of James N. Wallace, chairman; Henry R. Carse, John J. Mitchell, Robert I. Montgomery, H. A. Pomroy, William A. Read, J. Herndon Smith, Alexander M. White and Albert A. Wiggin, has been formed and asks the deposit of first refunding and extension mortgage bonds with the Central Trust Co., New York.

Interest on outstanding securities and equipment trust certificates maturing January 1 amounts to \$1,205,000. Arrangements have been made by the Pierce committee to pay the interest on the first and refunding extension mortgage bonds deposited with it in case the company fails to pay this interest.

Judge Ward in the U. S. Circuit Court has appointed F. A. Delano and George W. Alder as ancillary receivers for the Wabash Railroad for all the property in New York state. The receivers are appointed on application of the Westinghouse Electric Company, and the appointment of these receivers is concurred in by the Wabash directors.

The Chilean railway authorities have made a study of the use of briquets made from Chilean coal waste and are convinced they can be economically used. They have asked for bids for a five-year supply.